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## CHAPTER 4: OPTIMIZED MOBILITY

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### 4.1 Roadway System Performance

The vast majority of travel in the AMPA takes place by private vehicle. As many drivers know firsthand, the region already experiences areas of severe roadway congestion. Future years do not show any sign of reprieve as the area is projected to continue to grow and total vehicle miles traveled to continue to rise. MRMPO employs several data sources to establish a picture of roadway conditions in the AMPA. These include:

- Count/volume data from MRMPO's Traffic Counts and Monitoring Program
- Count/volume data from other regional partners such as the New Mexico Department of Transportation District 3 and ITS (Intelligent Transportation Systems) Bureau
- Speed and travel times gathered anonymously from mobile GPS devices sourced from a third-party vendor
- Infrastructure asset management programs from local agencies
- Travel behavior data from the recent Mid-Region Household Travel Survey

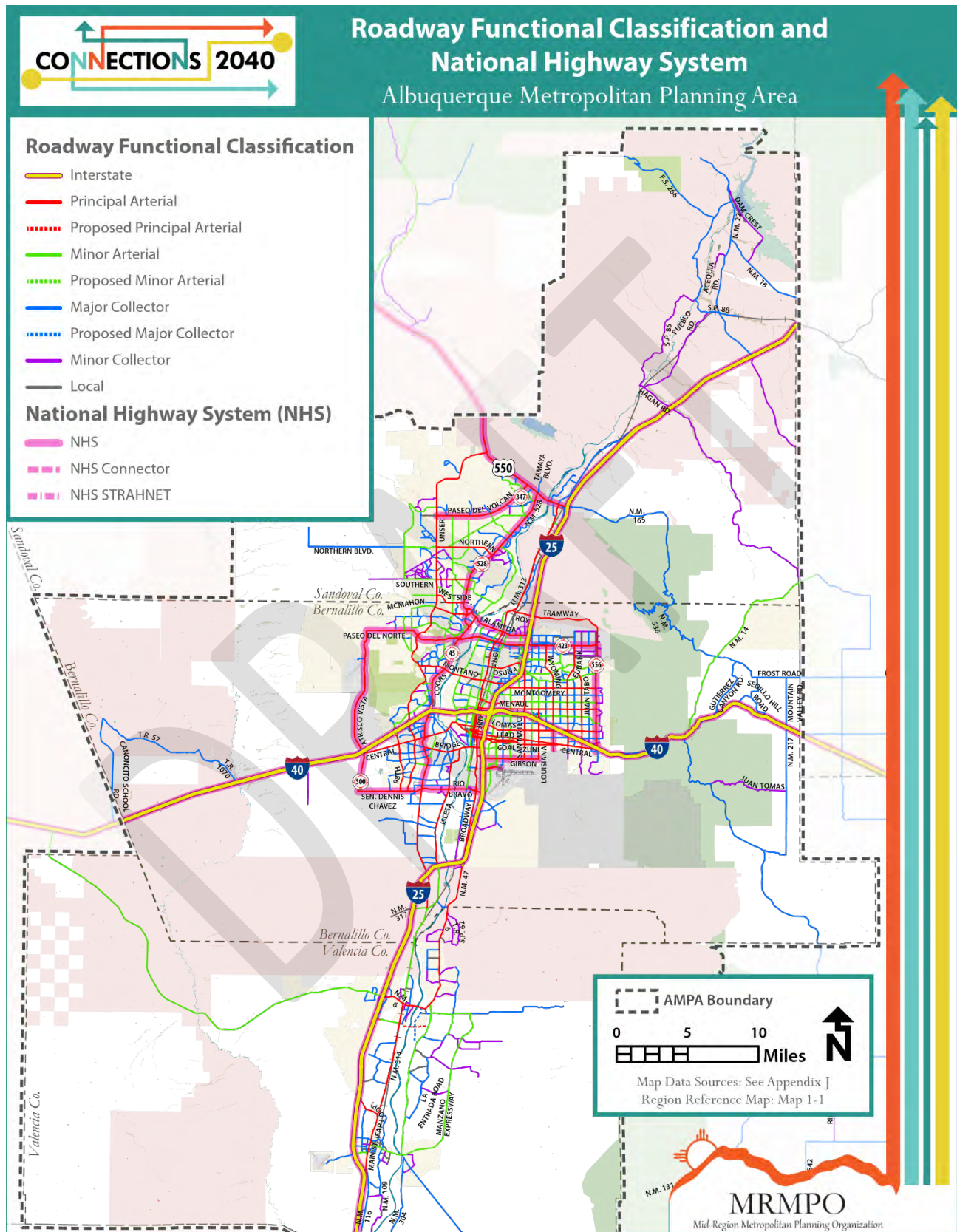
The MRCOG Traffic Counts Program allows us to monitor current travel conditions and past trends and identify patterns and congestion hotspots. It is as a useful tool used by planners to determine how the transportation system is operating currently. For future conditions, MRMPO staff employs a travel demand model which uses socioeconomic projections of future conditions and future roadway network improvements to generate anticipated travel demand and assess transportation system adequacy. This approach is used to identify areas of infrastructure need and helps guide the programming of transportation projects in the MTP. Addressing the mobility needs of a growing population in a time of limited transportation funding requires creative solutions. This chapter looks at some of the primary challenges from a roadway perspective that must be addressed as part of the transportation planning process. The MRMPO travel demand model is used throughout the MTP process to examine the impacts of the underlying land use patterns found in the Trend and Target Scenarios on future roadway conditions and consider how the region will maintain and improve the roadway network.

#### a. Current Travel Conditions and Patterns

##### ***MRCOG Traffic Counts Program***

Traffic counts are conducted on all federal-aid eligible roadways in the counties of Bernalillo, Torrance, Sandoval, Valencia, and Southern Santa Fe County and are coordinated through the MRCOG Traffic Counts and Monitoring Program. Within the AMPA, there are over 1,600 miles of roadway network with over 2,800 individual roadway segments. Traffic segments are counted on a periodic three-year cycle, resulting in approximately 1,000 counts being conducted each year. The program employs pneumatic tube counts stretched across the roadway and is evolving to include more advanced roadside detection such as side-fire radar devices or in-pavement inductance loops, which offer a less intrusive approach that can be applied to higher volume locations. The program forms the basis of the roadway performance monitoring responsibilities of MRMPO. Federal aid eligible roadways range from collectors to higher order arterials and are shown on the current highway functional classification system map seen below.

Map 4-1: Current Highway Functional Classification in the AMPA



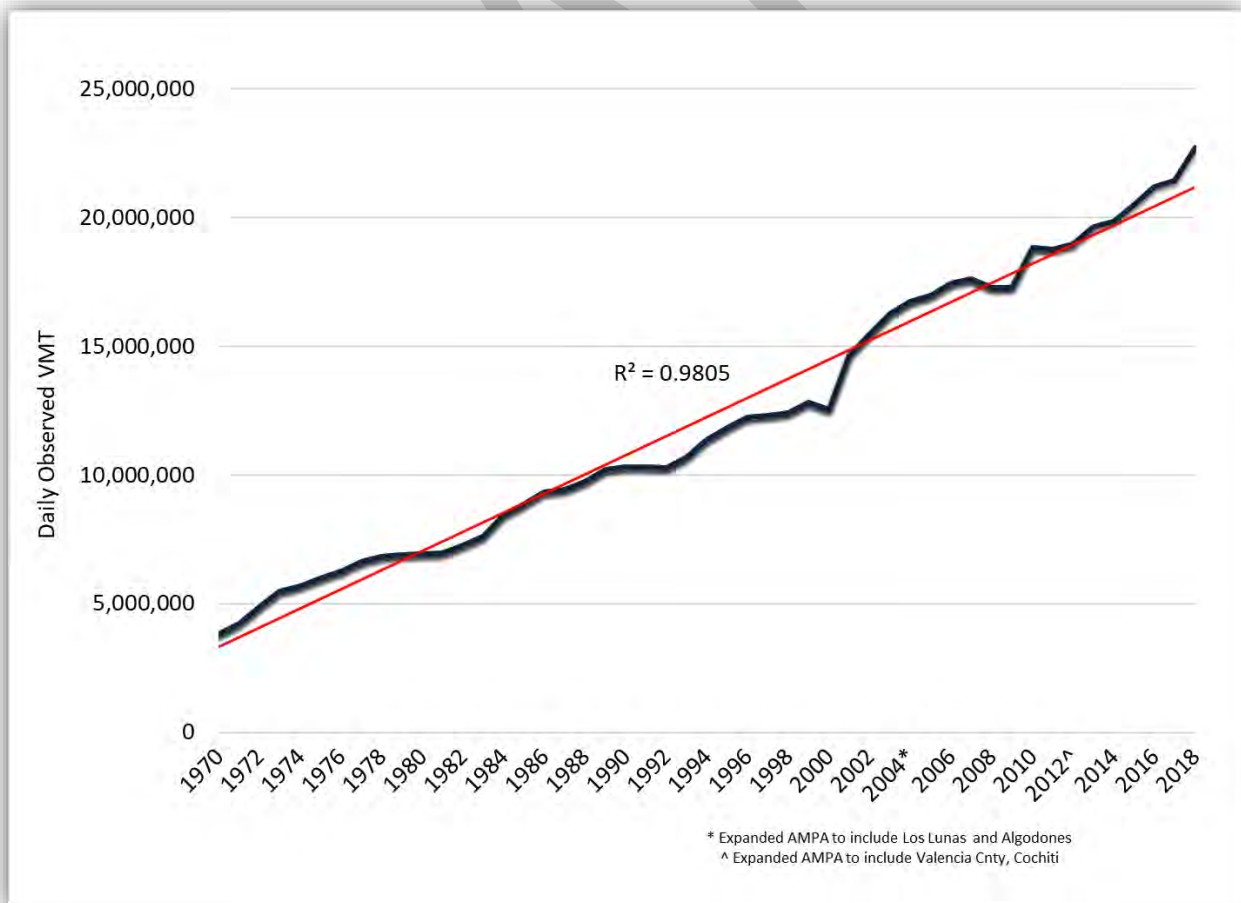
## Vehicle Miles Traveled

A key performance measure of the Traffic Counts and Monitoring Program is the calculation of vehicle miles traveled, or VMT. This statistic is generated from count and roadway network mileage data and reflects the total amount of vehicle travel on the entire roadway network. It is a useful measure of travel activity and roadway demand. Total VMT for the region provides a measure of the total amount of travel taking place on the network, which is both a factor of personal travel and population growth. Per-capita VMT is the measure of each individual's daily travel and contribution to the region's daily VMT. Lower per capita VMT is generally a good indicator of a well-balanced and accessible multi-modal transportation system for all users.

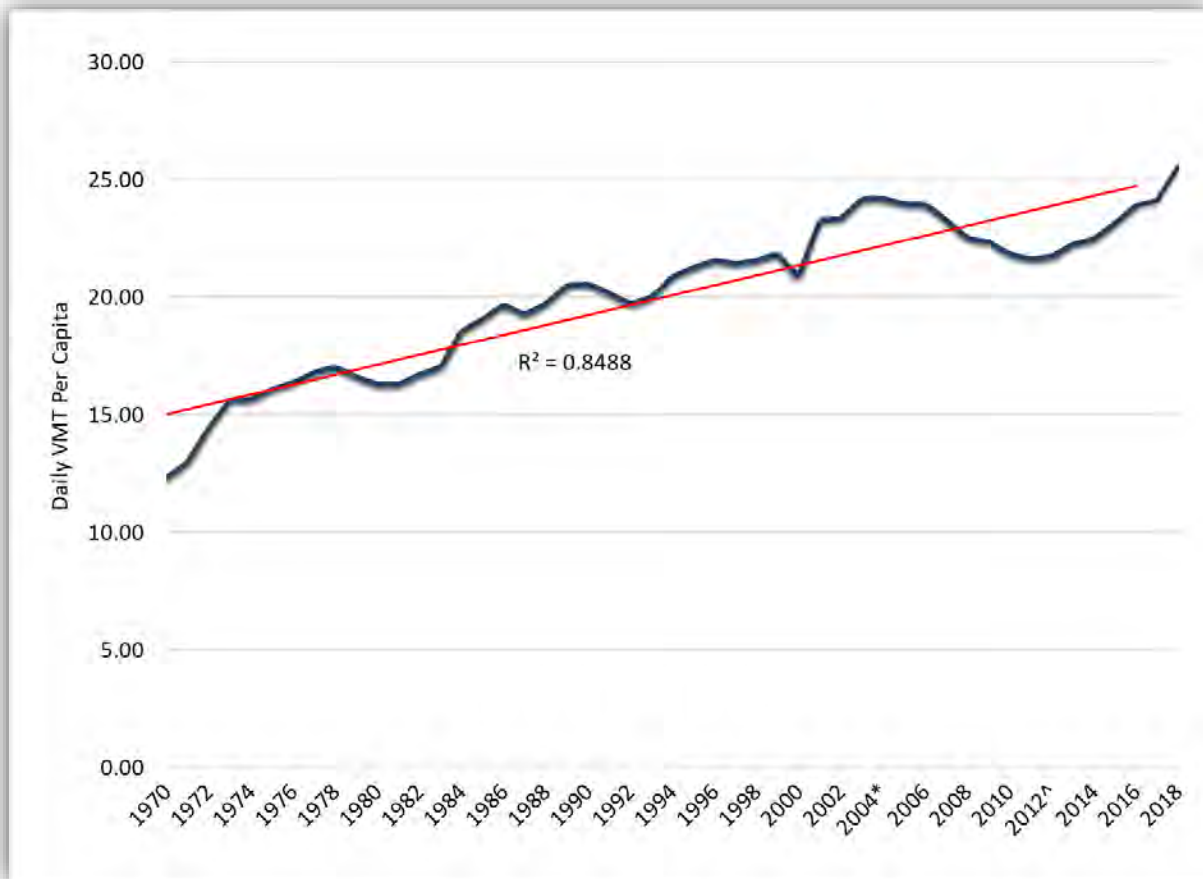
It is generally desirable for local transportation policy to encourage reductions in VMT as impacts grow with increased demands on the roadway infrastructure. As with the total VMT trend, the per-capita statistic captures slight variations with observed peaks and valleys reflecting shorter-term phenomena such as national energy price fluctuations, national and local economic forces, or major local construction projects, as well as longer-term trends that may be a result of larger fundamental travel behavior or availability of multi-modal options to SOV travel.

Historic data beginning in 1970 continuing through today shows there is a steady long-term increase in the amount of overall travel. A dip following the Great Recession was observed in the years following 2008, however; data is showing that in the following years through 2018 that the growth in VMT is actually beginning to return to the longer term increasing trend.

**Figure 4-1: Daily Vehicle Miles Traveled in the AMPA, 1970-2018**



**Figure 4-2: Per Capita VMT in the AMPA, 1970-2018**



### **b. Current Congestion Levels**

Whether it is the result of population increases, overburdened infrastructure, or land-use patterns that increase reliance on vehicles for transportation needs, roadway congestion is increasingly a fact of life in American cities. The result is diminished air quality, losses in economic activity due to delays, safety concerns, increased travel times for individuals, and overall reduced quality of life. These realities create a series of transportation challenges which need to be addressed in order to ensure that individuals, goods, and services move as efficiently as possible throughout a metropolitan region.

#### ***Volume to Capacity Ratios***

A simple method for indicating the amount of traffic on our roadways is a roadway's volume relative to the roadway's ability to carry that volume, a measurement known as the volume-to-capacity (V/C) ratio. As traffic volume increases it affects the ability of roadways to operate efficiently since speeds are reduced due to the increased traffic volume. When the volume approaches or exceeds the intended capacity the reduced speeds result in delay and congestion. The volume-to-capacity measure is simple to compute, provided that the agency has an adequate database of roadway volumes and a robust roadway network and lane inventory. MRMPO has both which makes this statistic a widely used measure; however, it is important to consider that in some cases a high V/C ratio may or may not always necessarily indicate congestion.



**Factors outside of the number of lanes such as signal operations and timing, lane widths, adjacent driveways, and other design features also influence congestion.** Volume-to-capacity when appropriately used remains a robust and practical first-tier indicator of congestion.

### ***Speed and Congestion***

Speed is another measure of congestion as trips are often considered in terms of how long it takes to get to a destination. Travel speed and travel time are directly related as speed is a measure of distance and time, as in *miles per hour*. Speed-based congestion is calculated based on the difference between the observed speed and the posted speed limit. Locations where one would expect lower speeds today are apparent, such as, at approaches to intersections, known as bottlenecks, or simply areas of high travel demand.

### ***PM Peak Hour***

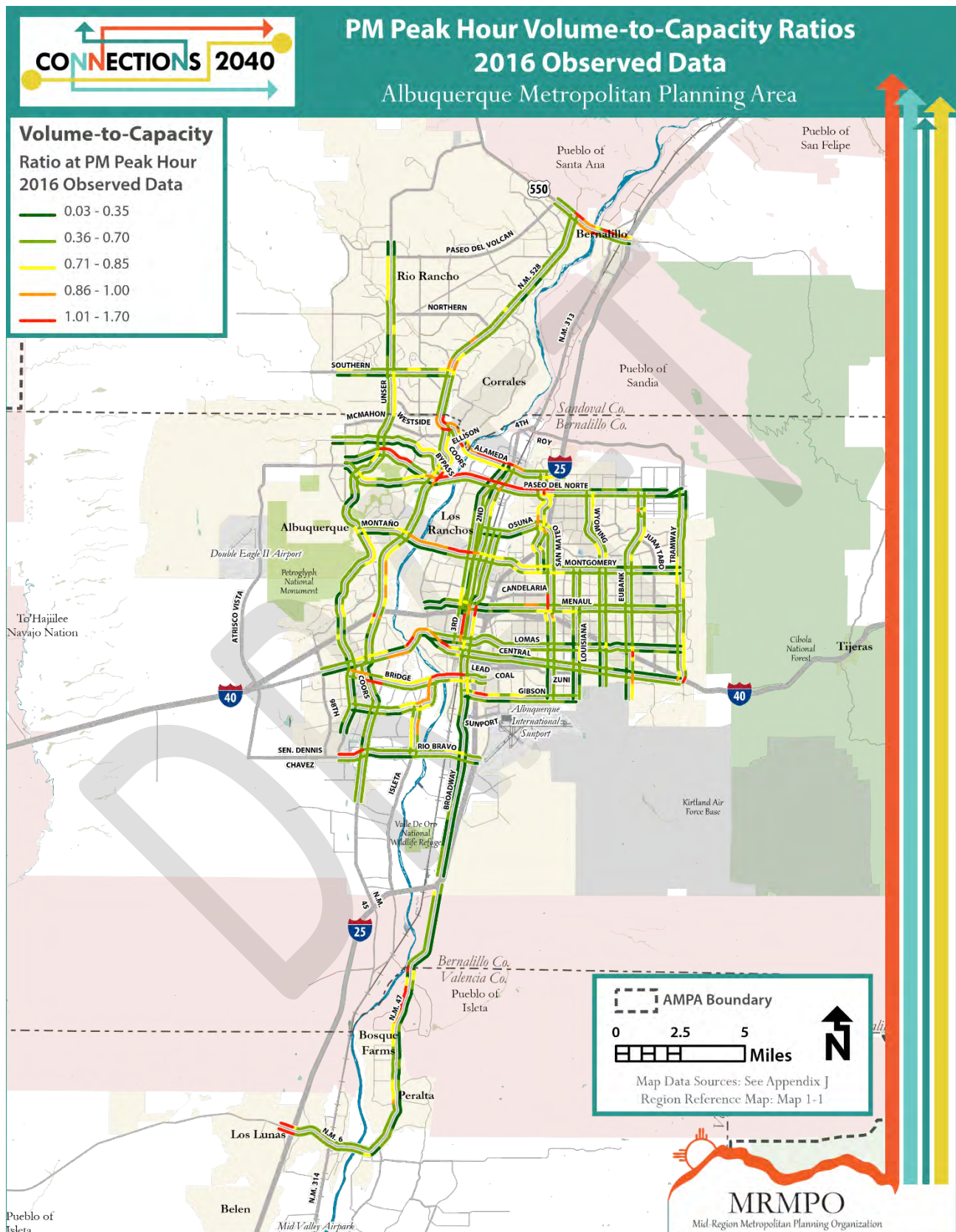
It is important to establish baseline congestion levels in the MTP so that future conditions and alternative scenarios can be evaluated in terms of relative change they might (or might not) provide. The timeframe for these measures is the PM peak hour, which constitutes the highest volumes and most diverse composition of travel during the day as it includes work-based trips as well as non-work-based trips.

#### **Data Collection Methodology**

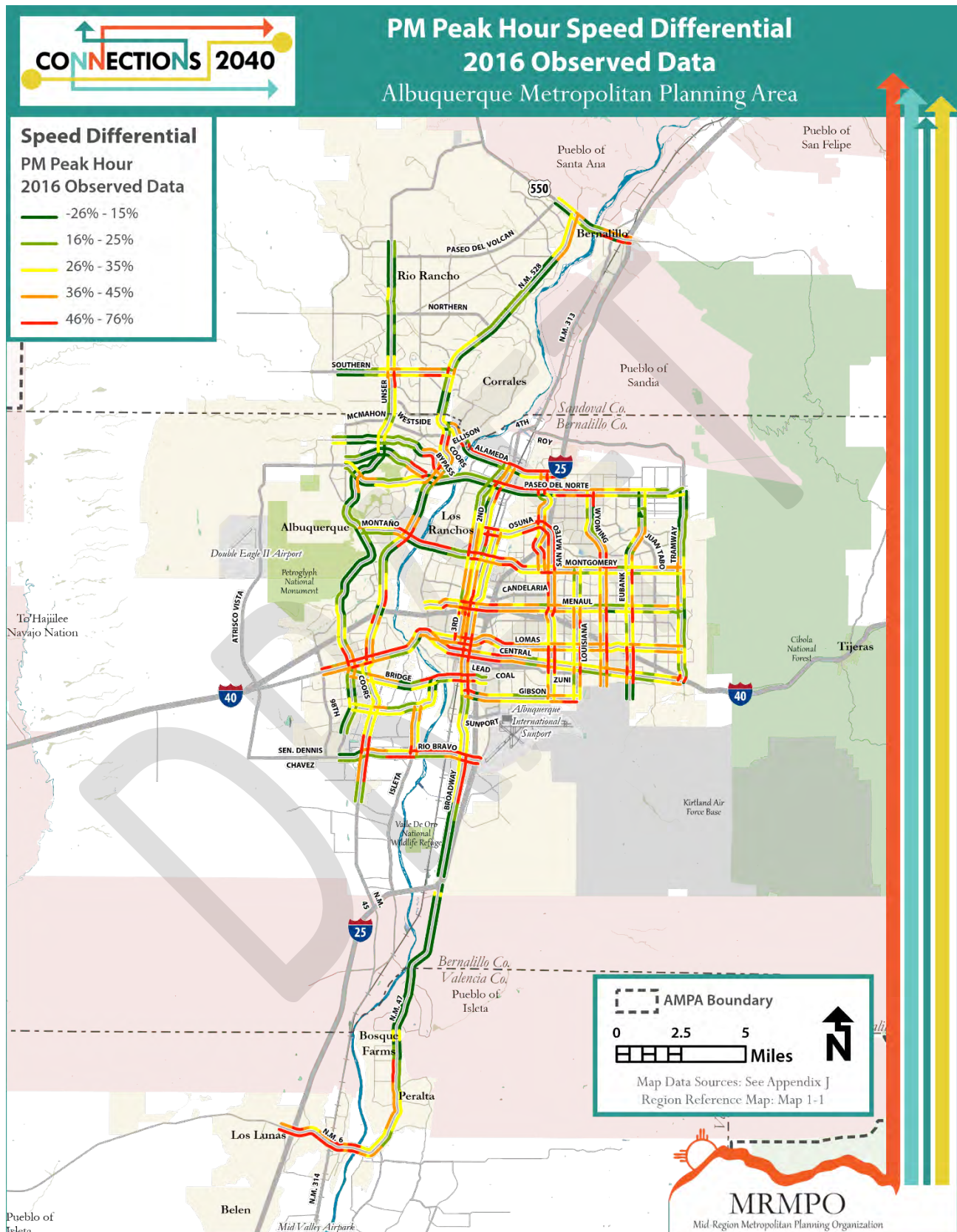
Travel conditions can be measured in terms of traffic “volume,” or traffic “speed.” Traffic volume is measured as the number of cars/trucks traversing a point on the roadway network during a particular time period, such as peak hour or weekday. Traffic volumes on each roadway segment are collected at least once every three years, and when compared to the roadway segment’s ability to carry those vehicles, a volume-to-capacity value is generated. Roadway capacity is based on measures such as the number of lanes, posted speed, and the functional classification or type of roadway (i.e., collector, arterial, freeway, etc.).

In addition, MRMPO purchases third-party travel time data from INRIX, which is comprised of GPS-enabled devices such as personal smart phones, GPS devices on vehicles, and GPS-enabled commercial-vehicle fleets. INRIX data shows the distribution of congested speeds for different times of the day and is a meaningful planning tool in the identification of problem areas on the roadway system.

Map 4-2: PM Peak Hour Volume-to-Capacity Ratios, 2016 Observed Data



Map 4-3: PM Peak Hour Travel Speeds, 2016 Observed Data





### c. Peak Period Traffic

The 2016 base year volume-to-capacity data shows that travelers experience “severe congestion” primarily along river crossings, portions of the interstate mainlines and interchanges, and arterial corridors carrying excessive amounts of commuter travel. “Over capacity” conditions within this hour are also observed at river crossings and portions of the interstate mainline and interchanges, with extensive system degradation shown on arterials.

#### **Peak Hour versus Peak Period**

Most of the analysis conducted by MRMPO has focused on the peak “one hour” of travel, the standard for traffic analysis. However, when travel demand is analyzed over the common industry standard of one hour, we might be missing an opportunity for the network to offer additional capacity over a longer timeframe, such as the “three-hour” peak period.

MRMPO has begun to explore the travel conditions associated with peak period travel for the longer three-hour periods. What we can see from the data is a more precise evaluation of when the roadway is above, below, or approaching capacity within this interval of time. This type of analysis reflects the phenomenon called “peak hour spreading.”

#### **Peak Hour Spreading**

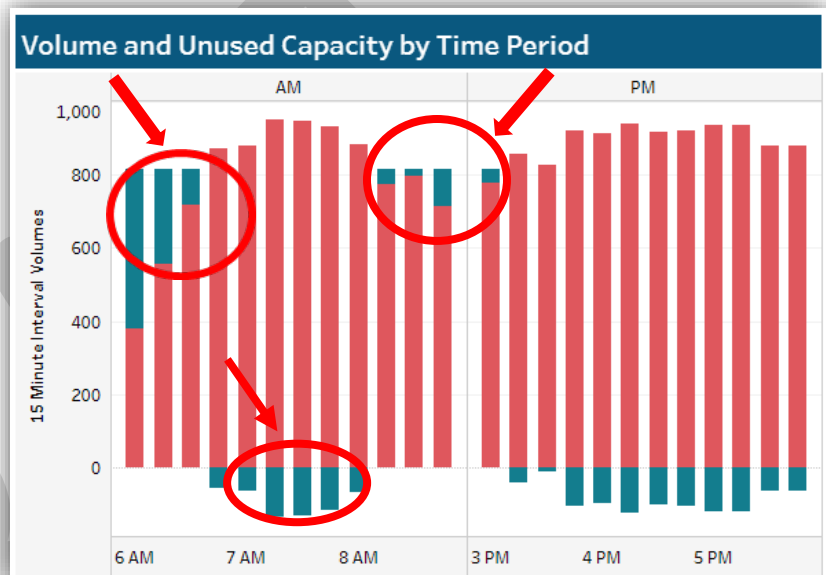
The graphic above depicts this phenomenon. In this example, we can see that there is an opportunity to take advantage of additional roadway capacity, without having to physically expand the roadway. As travel demand continues to increase, focusing on the “peak hour” will be inadequate, requiring MRMPO to analyze additional capacity using the entire three-hour peak period. Often, and on certain corridors where it is advantageous, these “tails” of the three-hour peak period contain a significant degree of cost-effective additional capacity. If travel patterns can be shifted or offset sometimes by as little as 15 minutes to ½ hour, additional capacity – without having to expand the roadway – can be easily achieved.

#### **Flexible Work Schedules**

Morning and evening traffic are typically condensed into this shorter timeframe, which naturally is associated with the start and end of the workday. This presents an opportunity to employ “flexible work schedules” which allow a shift in work start or end times, and thus can utilize the times of less-congested travel. Different approaches to congestion mitigation such as this one and others are included in the CMP section.

**Figure 4-3: Alameda Blvd River Crossing Peak Period**

Volume (demand) in red and the available capacity in blue for each 15' increment.





#### d. Commuting Flows

The dynamics of land availability and development patterns have a dramatic effect on transportation patterns. In recent decades much of the new housing stock has been located outside the urban core. Although many population serving jobs follow these rooftops, job concentrations and major employment centers remain primarily within urban employment centers and corridors where infrastructure is already in place.

##### ***Distribution of Housing and Jobs***

This distribution of housing and jobs **directly impacts commuting patterns** and creates a range of transportation challenges. Planners look to travel data from the Census Transportation Planning Package (CTPP), especially for county-to-county commuter flows, to shed light on regional travel patterns. Commuter flows for the four counties in the Albuquerque Metropolitan Statistical Area can be found below.

According to the CTPP, Bernalillo County exhibits the highest rate of internal “capture” at 95 percent, indicating that most Bernalillo County residents work in the county in which they reside. The lowest rate of internal capture is Sandoval County at 50 percent with Torrance and Valencia Counties at 57 percent and 55 percent, respectively. The high levels of external commuting trips for residents of these counties means heavy reliance on single-occupancy vehicle travel and places great strain on the regional roadway network.

**Table 4-1: 2016 County-to-County Workflows**

|                     |                   | County of Work    |                 |                 |                 |                 |          |              |
|---------------------|-------------------|-------------------|-----------------|-----------------|-----------------|-----------------|----------|--------------|
|                     |                   | Bernalillo County | Sandoval County | Santa Fe County | Torrance County | Valencia County | In State | Out of State |
| County of Residence | Bernalillo County | 94%               | 3%              | 1%              | 0.2%            | 0.6%%           | 1%       | 1%           |
|                     | Sandoval County   | 50%               | 44%             | 5%              | 0%              | 0.3%            | 2%       | 1%           |
|                     | Santa Fe County   | 7%                | 0%              | 91%             | 0.5%            | 0.1%            | 1%       | 1%           |
|                     | Torrance County   | 34%               | 0.2%            | 8%              | 57%             | 0.8%            | 1%       | 0.4%         |
|                     | Valencia County   | 43%               | 1%              | 1%              | 0.1%            | 55%             | 1%       | 1%           |

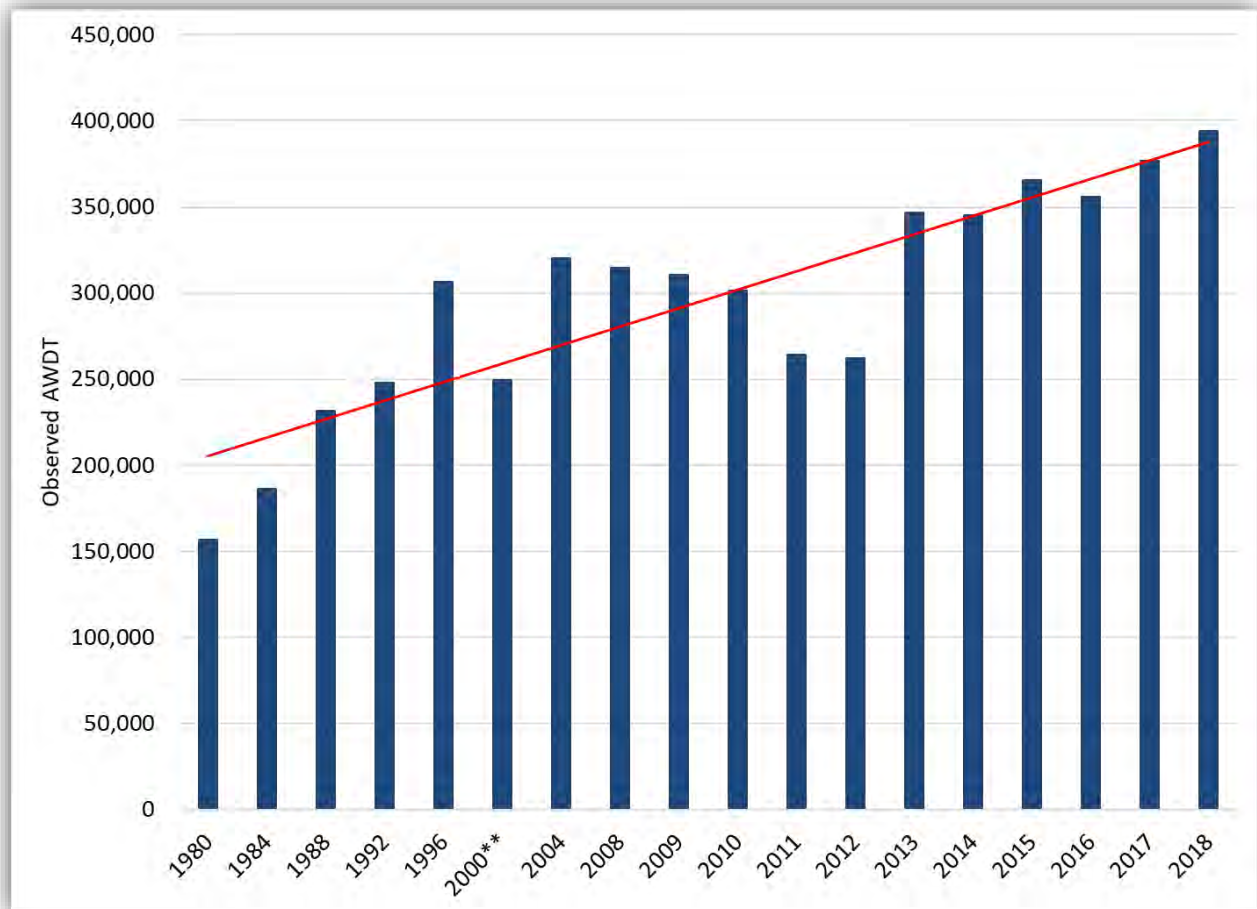
##### ***Key Locations of Congestion***

###### ***The Big I***

A key traffic monitoring location includes the intersection of the interstates I-40 and I-25, also known as the “Big I”. This system interchange encompasses a system of fly-over ramps, mainline through lanes, and frontage roads that carry nearly 400,000 daily vehicles. The confluence of these two major interstates not only support regional travel, but due to their exclusivity as the only major freeways in the AMPA, they play a critical part of the AMPA’s transportation system for local traffic.

As such, the volumes at this location provide a great “barometer” for the levels of travel demand in the region and have been part of the key-locations monitoring activity for many years. Note from the trend line that from 1980 through 2008, volumes were at a steady growth, however, after 2008 the growth in volumes began to slow as the region entered the Great Recession. Volumes plateaued and even dropped slightly in the ensuing years, however, they jumped in 2013 and have remained on a steady climb into 2018 (the latest year of count data).

**Figure 4-4: Average Weekday Daily Traffic at the Big-I, 1980-2018**



#### e. Crossing the River

Recent development patterns—in particular the prolific growth west of the river and in the northwest portion of the metropolitan area—place a heavy burden on the region’s transportation infrastructure. As a result, maintaining acceptable levels of service on river crossings has become a challenge, especially during the peak commuting timeframes. This challenge is an important one to highlight since the only additional widenings or new river crossings planned in the lifespan of the *Connections 2040* MTP include an additional lane in each direction of US 550, and a new crossing along the Morris Rd alignment in Valencia County.

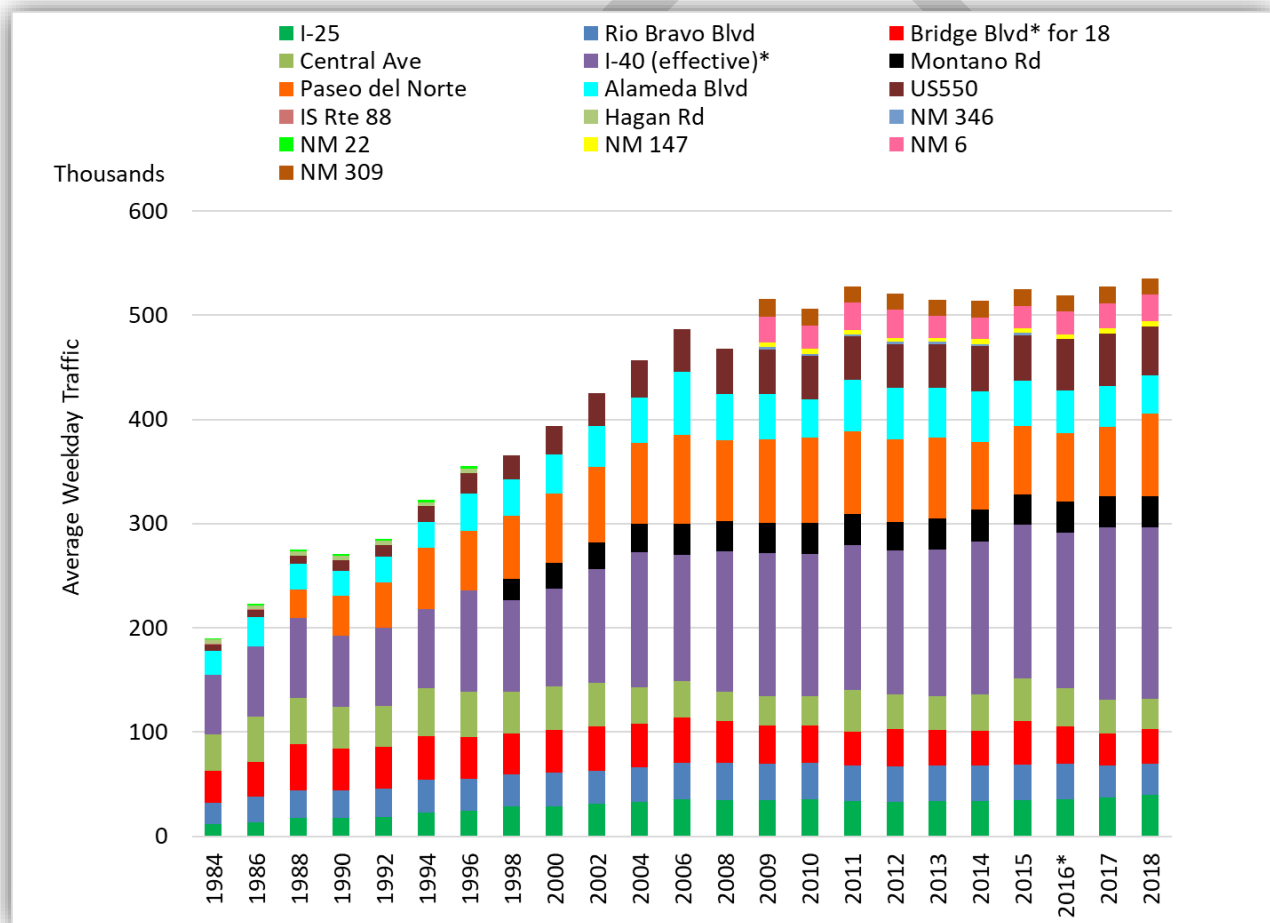
There are 16 river crossings within the AMPA, each operating at various levels of service during the morning and evening peak times of travel and combined supporting more than 500,000 daily trips across the Rio Grande. The river crossings that serve the northwest portion of the AMPA to employment and activity centers east of the river experience the greatest congestion and highest numbers of daily trips. These include Montano Rd, Paseo del Norte, Alameda Blvd, and US 550. However, other river crossings such as Rio Bravo

Blvd, Bridge Blvd and Central Ave (that are not along the large Northwest commute corridor mentioned above) also experience delays, thus strongly indicating that congestion is also associated with the operation of the roadway (such as with traffic signals) and not simply the magnitude of volume.

### Historical Traffic Growth

A review of historical average weekday traffic data shows an interesting pattern for growth in demand on river crossings over the years; tremendous growth occurred from 1984 to 2006, followed by relatively flat growth thereafter through 2018 (the latest year of count data). Like overall VMT trends, growth has flattened in recent years (although VMT growth is resuming), perhaps, in part, due to roadway capacity issues on the river crossings themselves, which may discourage travelers from making these trips. Nevertheless, growth in demand is expected to continue in future year scenarios of the MTP as the regional economy recovers and population and job growth continues across the region. **On the other hand, it is the land us patterns that create this demand and therefore it may make more economical (and environmental) sense to focus on jobs west of the river and encouraging trips with other modes of traffic across the river.**

**Figure 4-5: River Crossing Traffic in the AMPA, 1984-2018**



## f. Future Travel Demand Analysis

MRMPO maintains a regional travel demand model in order to best assess the impacts of growth on future travel conditions. This evaluation tool differs from the current datasets that are based on actual count and recorded speed data in that it *models* roadway travel conditions, allowing for the evaluation of different combinations of socioeconomic and transportation scenarios.

### ***Land Use and Transportation Relationship***

In this manner, the land use-transportation relationship can be evaluated through forecasted future socioeconomic data distributions (housing and jobs growth) and roadway infrastructure scenarios to identify specific problem areas. Future year roadway scenarios inform the transportation planning process by allowing agencies to identify the infrastructure improvements needed to support the region's mobility needs.

In particular, the modeled scenarios allow for an assessment of anticipated roadway capacity deficiencies in 2040. The analysis also sheds light on whether roadway infrastructure improvements do in fact mitigate congestion and improve safety and mobility. The Trend Scenario represents the forecast according to existing policies and plans while the Target Scenario reflects the desire of MRMPO member governments to address regional needs through changes in land use policy and potential transit investments.

Modeled roadway network scenarios contained in the *2040 MTP* include:

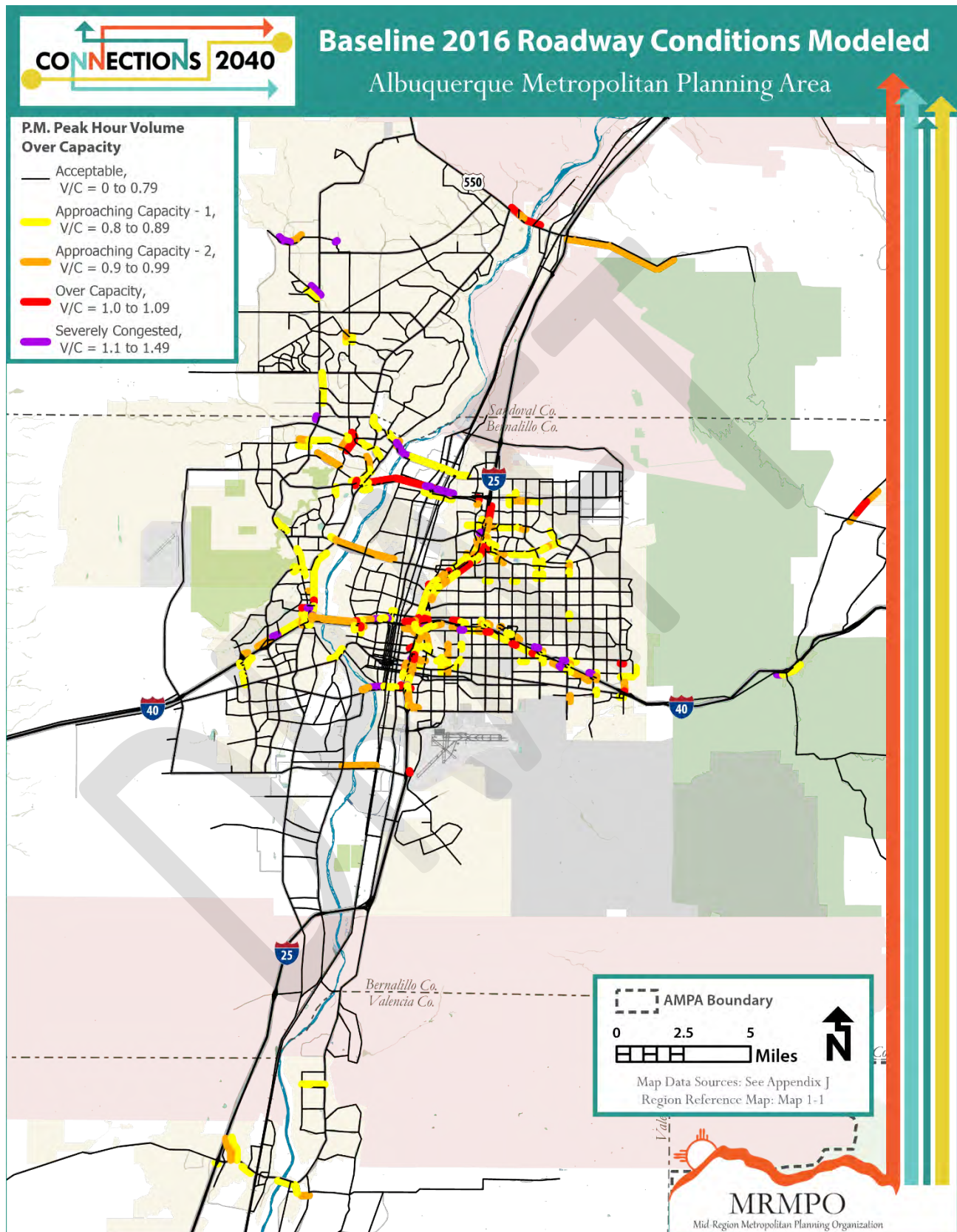
- **2016 Baseline** reflects the modeled or simulated conditions found in the region today. This scenario forms a standard upon which future year scenarios can be compared and analyzed.
- **2040 Trend No-Build** shows the impacts of anticipated socioeconomic growth on the “no build” roadway network, which represents what might happen were there to be no improvements to the infrastructure beyond the projects with committed funding through 2016<sup>1</sup>.
- **2040 Trend Build** represents the same level and distribution of growth as the No-Build Scenario but with the additional roadway infrastructure implemented using funds available from 2016 to 2040.
- **2040 Target Build** represents the alternative growth scenario, or Target Scenario, with programmed roadway and transit investments.

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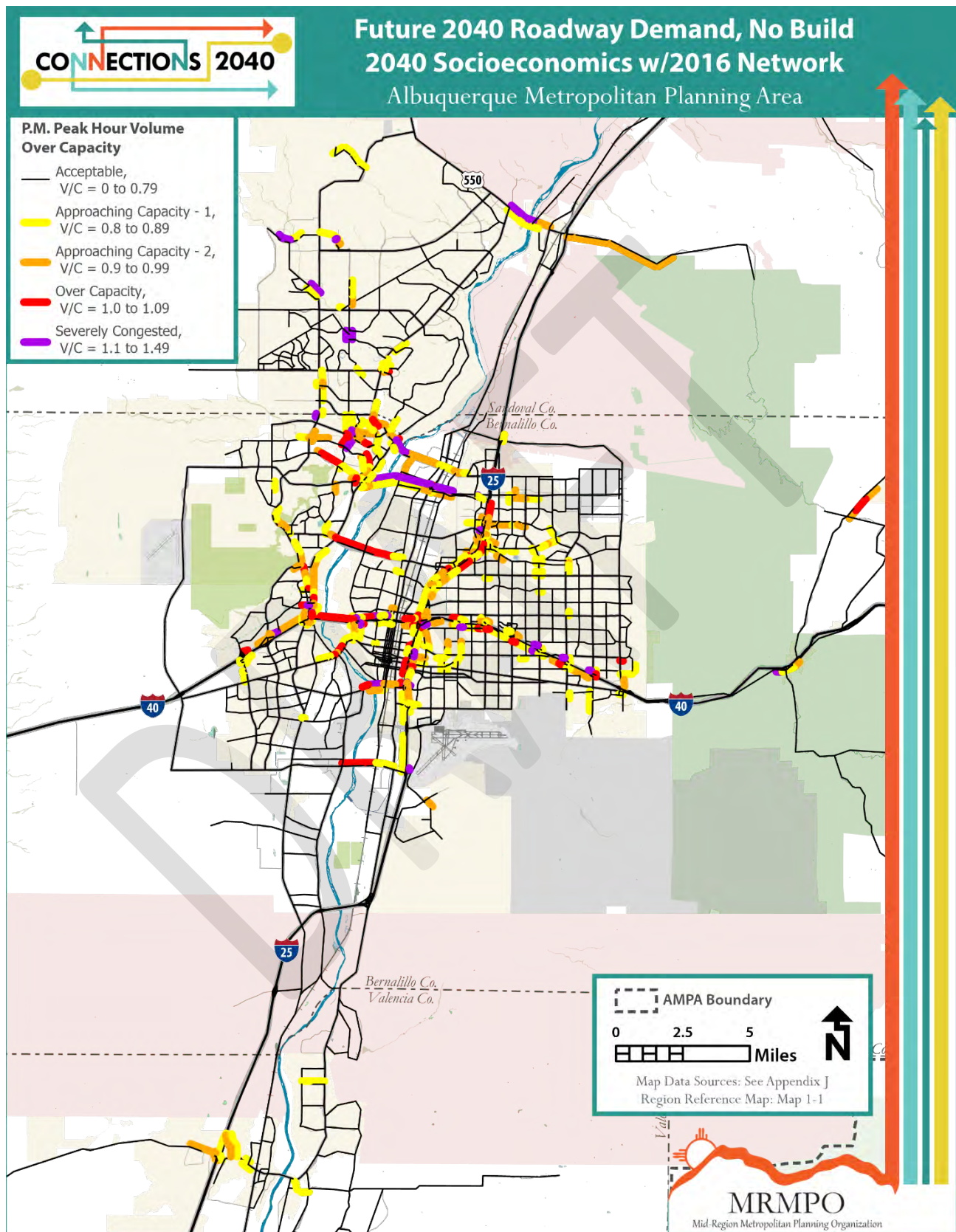
<sup>1</sup> A “committed” transportation network includes projects currently programmed in the TIP and Capital Improvement Programs of local agencies. These projects are considered imminent as they are already in the project development and implementation phases, and as such, are likely not subject to change.



Map 4-5: PM Peak Period Volume-to-Capacity Ratios, 2016 Model Baseline

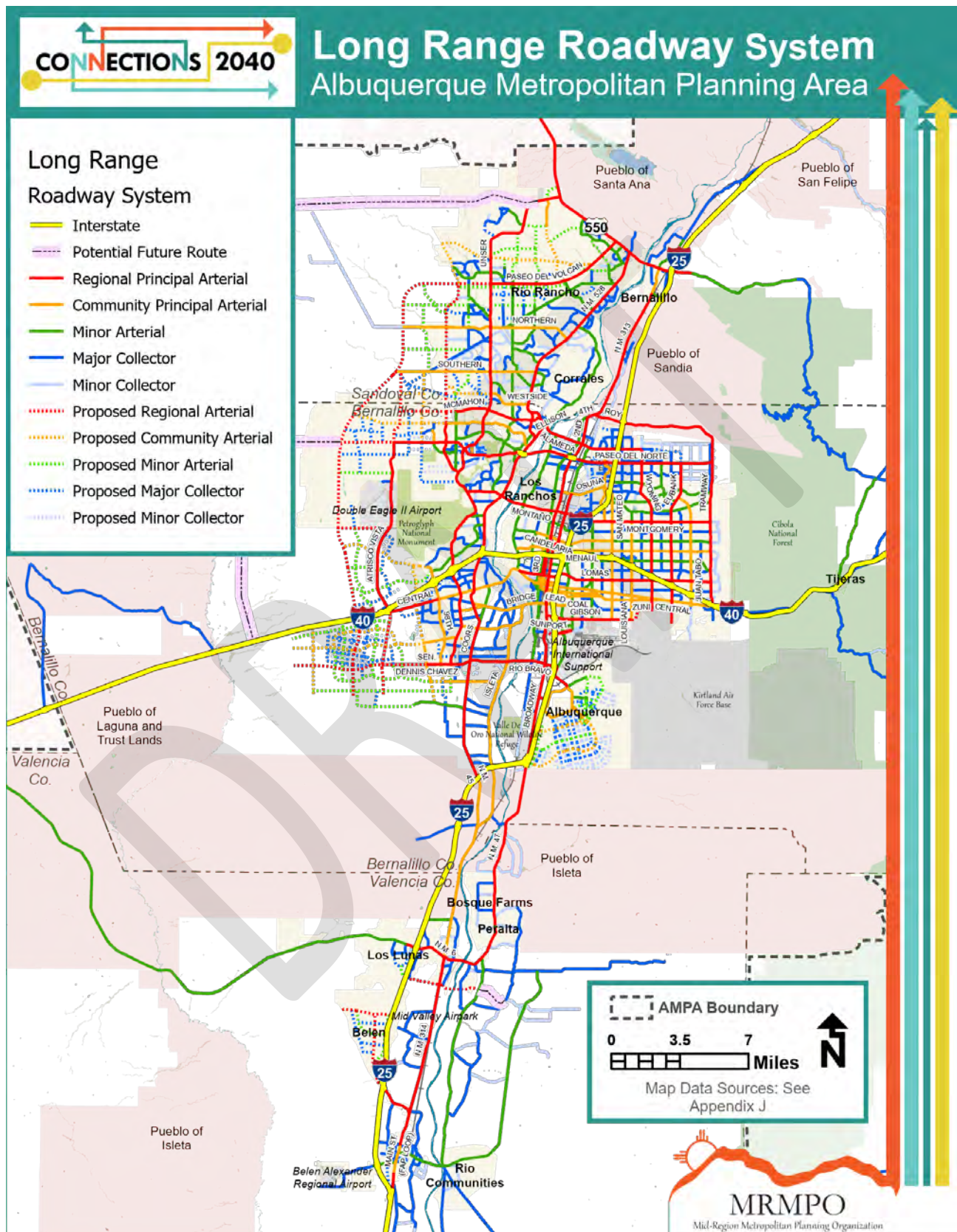


Map 4-6: PM Peak Hour Volume-to-Capacity Ratios, 2040 Trend No-Build Scenario





Map 4-11: Long Range Roadway System (LRRS)



[The following items are in process of being updated.]

Table 4-2: Base Year and Trend No-Build Roadway Performance Summaries, PM Peak Hour

Table 4-3: Trend and Target Scenarios Roadway Performance Summaries, 2040 PM Peak Hour

Table 4-4: Roadway Network Lane Miles

Map 4-7: Roadway Network Expansion Projects included in the *Connections 2040 MTP*

Map 4-8: PM Peak Hour Volume-to-Capacity Ratios, 2040 Trend Build Scenario

Map 4-9: PM Peak Hour Volume-to-Capacity Ratios, 2040 Preferred Build Scenario

Map 4-10: Differences in Daily Volume between 2040 Trend and Preferred Scenarios

a. Future Roadway Network Priorities

Table 4-5: Network Gaps and Priorities

Figure 4-6: Setting Network Priorities

| PM Peak Hour         | 2016 Baseline | 2040 Trend No-Build | Percent Difference, 2040<br>No-Build vs. 2016 |
|----------------------|---------------|---------------------|---|
| VMT                  |               |                     |   |
| VHT                  |               |                     |   |
| VHD                  |               |                     |   |
| VMT Over Capacity    |               |                     |   |
| Congested Lane-Miles |               |                     |   |
| Average Speed        |               |                     |   |
| Daily VMT/Capita     |               |                     |   |

| Network Expansion  | 2016 | 2040 | Percent Increase (2012 - 2040) |
|--------------------|------|------|--------------------------------|
| Network Lane Miles |      |      |                                |
| Population         |      |      |                                |



## 4.2 Transit System Performance

### a. Rise and Fall of Transit Ridership

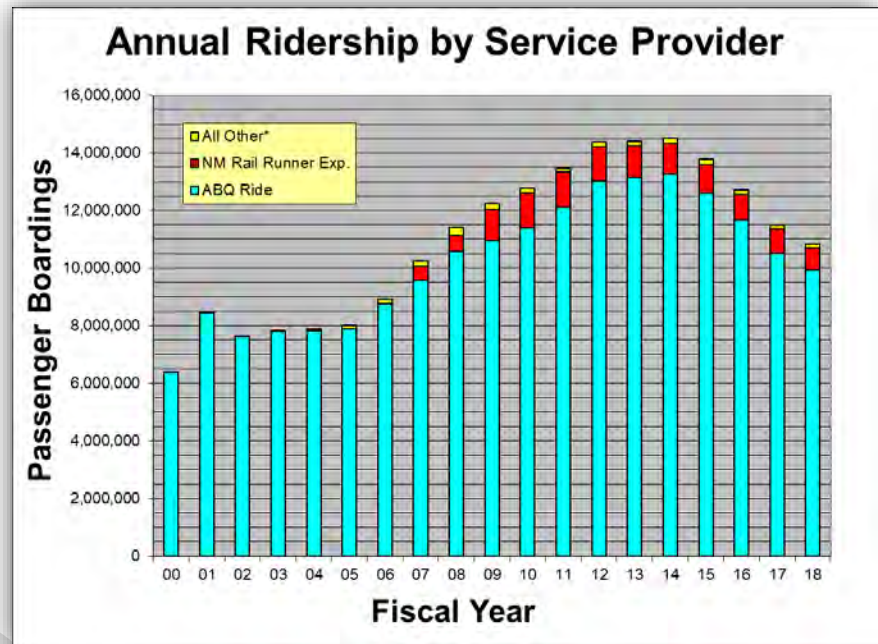
Transit ridership in the Albuquerque metro area was on the rise for much of the past 20 years. Annual transit ridership leveled off in the region between 2012 and 2014 before it began declining in 2015. When the previous MTP was written (Futures 2040), transit was growing explosively in the region, outpacing the national trend. Between 1995 and 2012, passenger trips increased 120 percent (6.5 to 14.4 million trips) and passenger miles traveled increased 365 percent (21.5 to 100.2 million miles).

The impressive growth in transit ridership in the region was attributed to the introduction of ABQ Ride's Rapid Ride service (beginning in 2004) and Rio Metro's NM Rail Runner Express service between Belen and Santa Fe (service began between Belen and Bernalillo in 2006 before being extend to Santa Fe in 2008). Despite recent declines in ridership, MRMPO still sees transit as an important way to fulfill the region's travel needs.

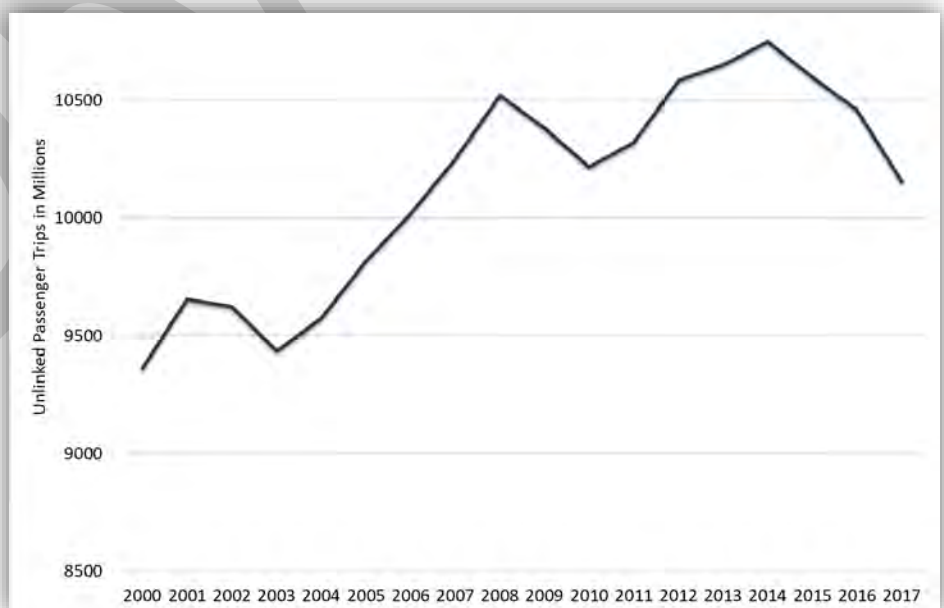
Source:

<https://www.apta.com/research-technical-resources/transit-statistics/public-transportation-fact-book/>

**Figure 4-7: Annual Transit Ridership in the Region**



**Figure 4-8: Transit Ridership in the United States, 2000-2017**



## Benefits of Transit

Transit is an equitable mode of transportation that does not require an initial capital investment from users. Transit is therefore a crucial means of transportation for those who cannot afford a car or other private transportation. **In fact, Harvard researchers believe reliable transportation to be the most important means of escaping poverty<sup>2</sup>.** Investing in reliable transit can therefore be a method of reducing poverty in our region. Transit also reduces greenhouse gases by moving more passengers with fewer vehicles and requires less road space to move people than cars, therefore reducing roadway demand and congestion. Greenhouse gas emissions are reduced by enabling compact transit-oriented development, which conserves land and decreases the distances people need to travel to reach important destinations<sup>3</sup> Area residents already realize many of the benefits that transit can provide to communities, as summarized by the American Public Transportation Association (APTA):

- Greater transportation mode choice
- Increased economic activity
- Access to employment, schools and universities, government services, health care, business, and industry
- Mobility for persons without access to a vehicle or who are not able to drive a vehicle
- Reduced congestion, which results in decreased travel times and fuel consumption
- Savings from lower gas and vehicle-related expenses
- Lower carbon and other pollutant emissions

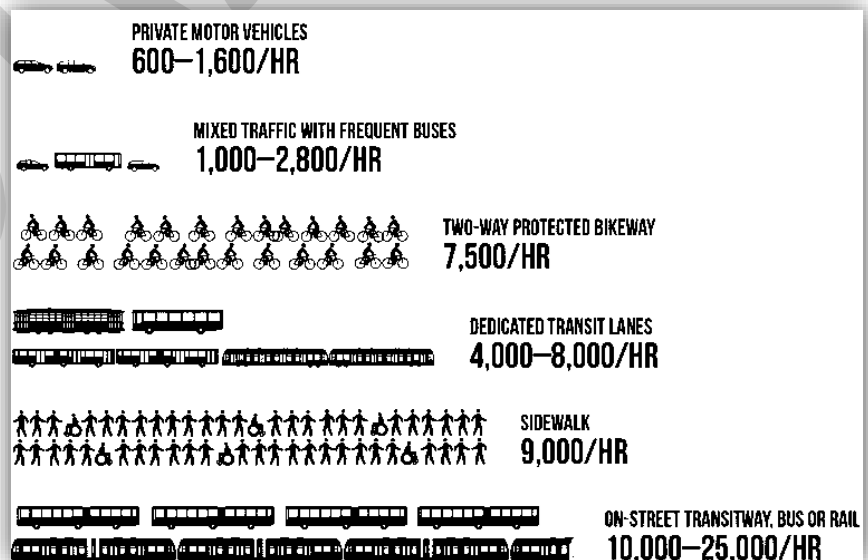
## Moving People

Transit is one of the most space efficient means of transportation. Most congestion is caused by too many vehicles in too little road space. One way to reduce congestion is to move more people with fewer vehicles. See the figure for a representation of how many people the equivalent of one car lane's worth of urban road space can move. This graphic clearly illustrates the importance of incorporating transit into our transportation system.

**Figure 4-9: Moving People Per Hour (HR)**

Source:

<https://nacto.org/publication/transit-street-design-guide/introduction/why/designing-move-people/>



<sup>2</sup> [https://www.nytimes.com/2015/05/07/upshot/transportation-emerges-as-crucial-to-escaping-poverty.html?\\_r=1&abt=0002&abg=0](https://www.nytimes.com/2015/05/07/upshot/transportation-emerges-as-crucial-to-escaping-poverty.html?_r=1&abt=0002&abg=0)

<sup>3</sup> <https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/transit-environmental-sustainability/transit-role>

## b. Ridership and Socio-demographics

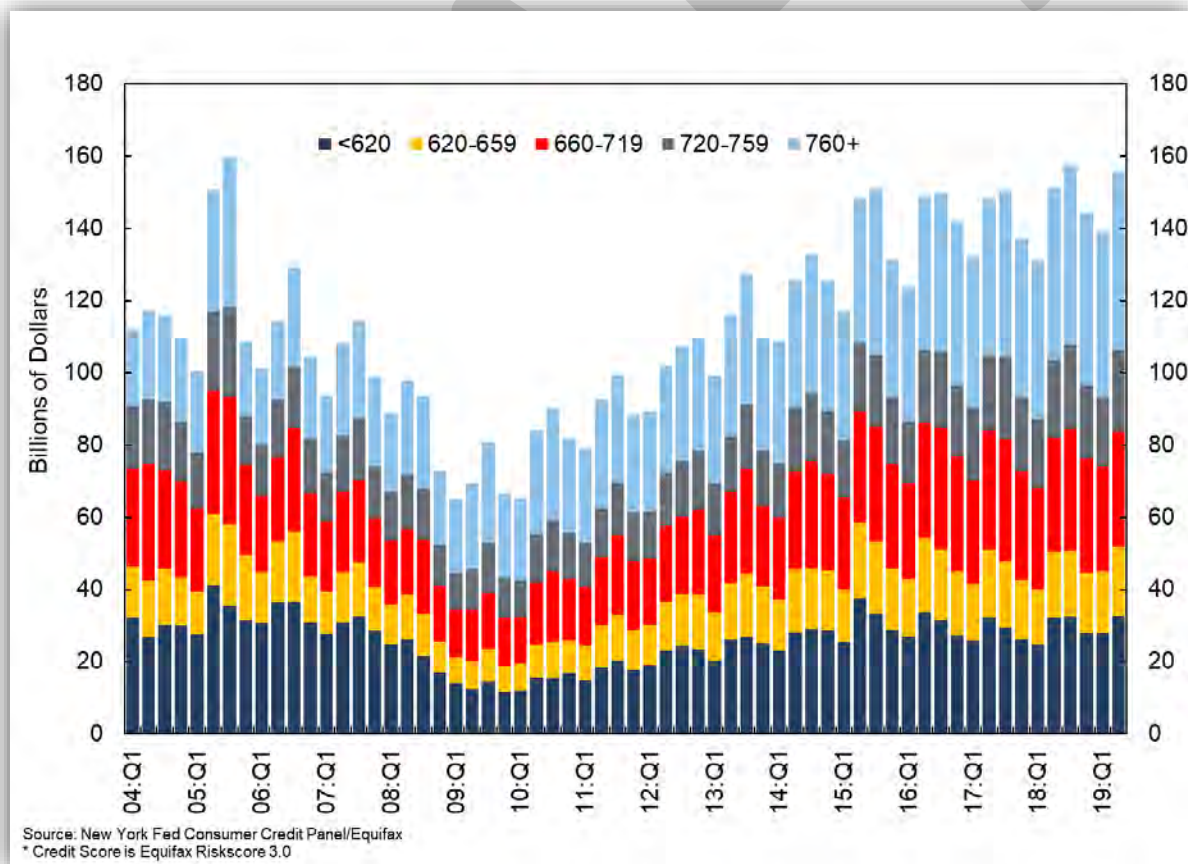
### ***Why Is Transit Declining?***

Passenger trips in 2017 declined by 21 percent in the Albuquerque region since they peaked in 2014. Transit ridership across the country declined by 5.6 percent between 2014 and 2017. The decline in the region's transit use coincides with a growth in vehicle miles traveled (VMT). It is unclear exactly why transit ridership is down across the country, but experts believe worsening transit service, paired with the rise of ridesharing and easier access to automobiles, is primarily the reason.

### ***Erosion of Cost Competitiveness***

One contributing factor to the decline in transit ridership, according to the American Public Transportation Association (APTA), is that the cost of car ownership is down. Low gas prices and easy access to auto loans are making the cost of owning and operating a car less of a barrier, and it appears that many people who typically have relied on transit are choosing to buy a car instead. The number of auto loans being made has reached pre-recession levels, including a large amount of loans being made to people with poor credit scores. The average gas price for the year 2018 (\$2.64) was 24 percent below the average gas price (\$3.45 between 2011-2014) during the post-recession years.

**Figure 4-10: Auto Loan by Credit Score**



Source: [https://www.newyorkfed.org/medialibrary/interactives/householdcredit/data/pdf/HHDC\\_2019Q2.pdf](https://www.newyorkfed.org/medialibrary/interactives/householdcredit/data/pdf/HHDC_2019Q2.pdf)

## *The Rise of Ride Sharing and Micro-mobility*

Ride hailing apps like Uber and Lyft offer an interesting alternative to using a private automobile that many consumers find slightly cheaper and more convenient than using a traditional taxi service. Proponents of ride hailing apps argue that they enable people to live car-free by giving them access to cars on the occasions they need them. Recent studies have suggested that ride hailing apps may be reducing people's use of transit service. A study conducted by the University of California-Davis Institute of Transportation Studies surveyed ride sharing service users in several major American cities and found that their subjects' transit use declined by six percent<sup>4</sup>.

The introduction of shared micro-mobility into the region offers a new way of making short trips. Micro-mobility refers to very light vehicles such as electric scooters, bicycles, and electric bicycles that can be used as a means of transportation. Many companies and cities are introducing fleets of shared bicycles and/or electric scooters that are placed at key locations throughout a city and can be rented using an app and left in the public right of way near the user's destination.

**Figure 4-11: Pace Bike Share in Albuquerque**



Between May and September of 2019, Spin Scooters were used for more than 40,000 trips while the Pace bike share logged just under 10,000 in the same period<sup>5</sup>. Nationwide shared micro-mobility use has exploded, with 84 million trips being made in 2018<sup>6</sup>. This way of getting around is new and not well understood, but some believe micro-mobility may be competing with transit for some short trips. However, most experts believe the two modes may be more symbiotic than competitive. Researchers at the TransitCenter, a foundation in New York City, believe shared micro-mobility may help connect more people to transit and overcome the first and

last mile problem<sup>7</sup>. Micro-mobility may make transit more viable in low density areas where frequent transit cannot be provided within a short walk. Micro-mobility enables potential transit users to easily travel one or two miles to a transit stop meaning frequent transit can be consolidated on major roads.

### *Single Occupancy Vehicle Convenience*

The TransitCenter in New York City has also been surveying residents of several large US cities to try to understand the nationwide decline in transit ridership. In a 2019 study, they found that the car is the main competitor with transit.

**"An uptick in driving dominates changes in the transportation market, as car trips unambiguously replace trips on transit and other modes of travel. As buying a car gets easier in a car-friendly world and demanded trips increase and disperse geographically, more people are driving, and more often<sup>8</sup>."**

<sup>4</sup> <https://www.govtech.com/fs/transportation/Study-Ride-Sharing-Decreases-Public-Transit-Use.html>

<sup>5</sup> <https://www.abqjournal.com/1366980/e-scooters-log-more-than-40000-trips-so-far.html>

<sup>6</sup> <https://nacto.org/shared-micromobility-2018/>

<sup>7</sup> <https://www.govtech.com/fs/transportation/Micro-Mobility-Is-Here-to-Stay-Cities-Should-Act-Accordingly.html>

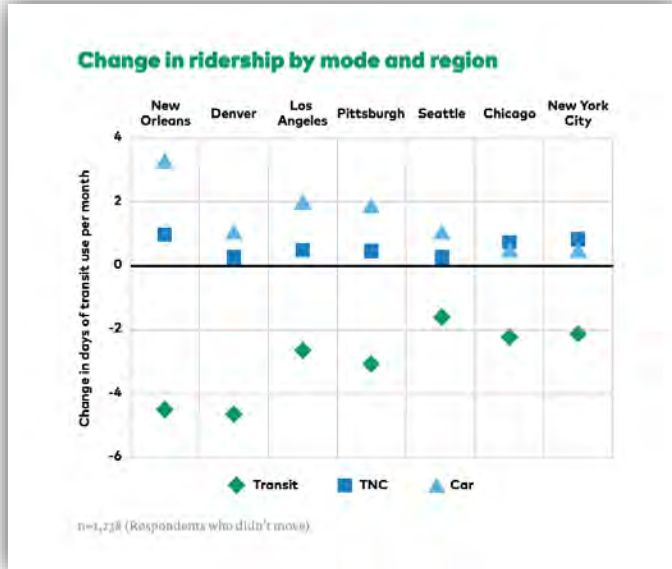
<sup>8</sup> <https://transitcenter.org/publication/whos-on-board-2019/> "Who's on Board?" 2019



The TransitCenter research found that Transportation Network Companies (TNC) like Uber and Lyft were not as significant as new car trips when explaining why the recent transit decline.

**Figure 4-12: Comparison of Change in Transit Ridership**

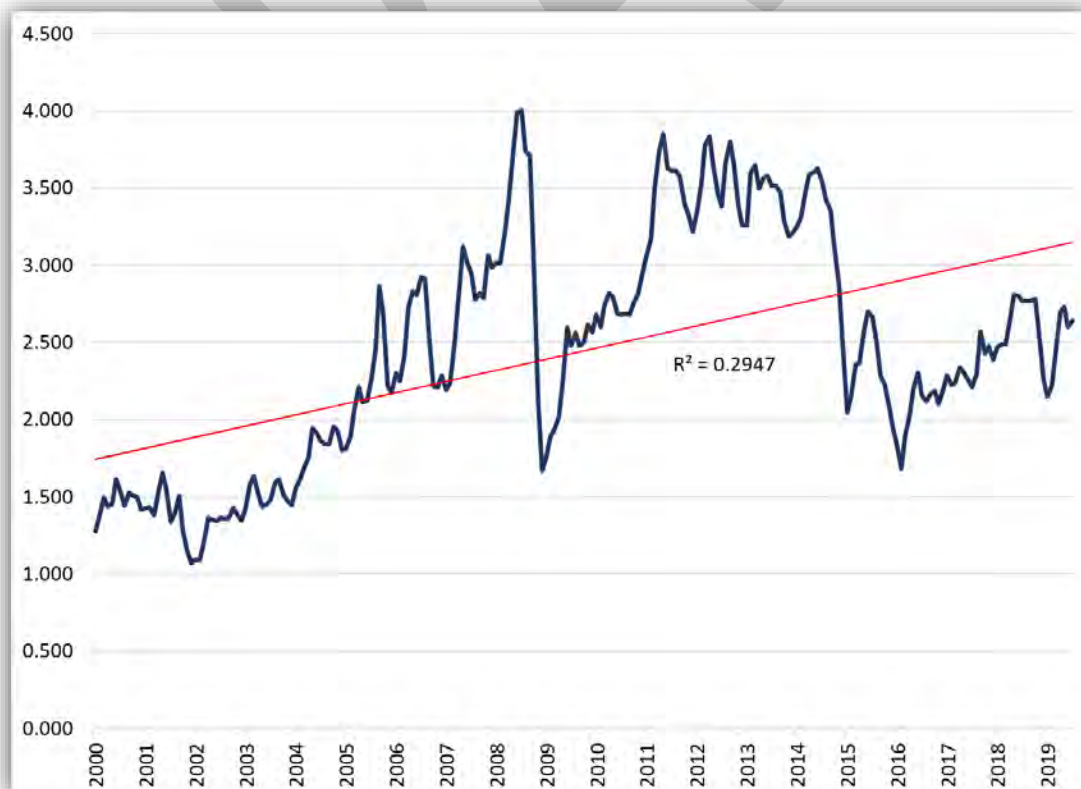
Source: <https://transitcenter.org/publicatio/whos-on-board-2019>



#### *Reliance on Easy Credit and Low Gas Prices*

In the Albuquerque metropolitan area, driving a car is the most convenient and fastest way to get around for virtually all trips. In the past, transit has been attractive primarily because it is cheaper than owning and operating a car. When there are fewer barriers to financing a car and lower operating costs, it follows that more people will drive, and fewer will take transit. However, relying on easy credit and low gas prices to meet the public's transportation needs may not be wise. In the event of an economic downturn, people who took out loans for cars may miss payments and have their cars repossessed, in which case, they will need access to economical and reliable public transportation. The same goes for gas prices should they rise again.

**Figures 4-13: Average Historical Gas Prices (Federal Reserve Economic Data)**



## ***Bus Service Investment***

The American Public Transportation Association (APTA) found through data analysis and focus groups that bus service is worsening, and customers are leaving as a result<sup>9</sup>. Between 2000-2017, bus ridership fell nearly 16 percent, but rail ridership grew by 43 percent during the same period<sup>10</sup> (Ibid). APTA believes this demonstrates that investments made in recent years in rail transportation have attracted new riders, while a lack of investment in bus service is responsible for the worsening service and falling ridership.

In the Albuquerque metropolitan area, few investments have been made in transit since the creation of the Rail Runner and Rapid Ride services. It is possible that more transit riders can be attracted through further improvements in service. Service has yet to begin on the Albuquerque Rapid Transit, but it will be interesting to see whether an improvement in service along the corridor can build ridership.

### **c. Regional Transit Partners**

#### ***City of Albuquerque Transit Services (ABQ Ride)***

ABQ Ride was founded with the City of Albuquerque's acquisition of the struggling, privately-operated Albuquerque Bus Co. and Suburban Lines in 1965. ABQ Ride currently operates the following bus services within the City of Albuquerque and portions of the City of Rio Rancho, Village of Los Ranchos de Albuquerque, and unincorporated Bernalillo County:

- Two Bus Rapid Transit routes: Two previous Rapid Ride routes changed over to Bus Rapid Transit called Albuquerque Rapid Transit, or ART, in December of 2019. These routes have their own right-of-way allowing them to be more consistent in terms of timing (reliability), and more frequent – stopping at each station around every 8 minutes. They are also 60-foot articulated buses able to carry more passengers.
- One Rapid Ride route: Rapid Ride functions as a premium service with stops placed approximately one mile apart; thus, they travel at a higher speed than the local routes that they commonly overlap. The 60-foot articulated Rapid Ride buses also serve more developed stops and stations than local and commuter routes.
- 22 local routes: Local routes operate primarily along arterial streets at both peak and mid-day hours, and typically serve bus stops that are located one-quarter mile apart or less.
- 16 commuter routes: Commuter routes connect outlying residential areas with major employment centers during AM and PM peak hours only.
- Paratransit: ABQ Ride's Sun Van paratransit provides door-to-door service in Albuquerque and portions of Bernalillo County for riders who have satisfied eligibility requirements, p. Per federal requirements (49 CFR 37.131),

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<sup>9</sup> <https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Understanding-Recent-Ridership-Changes.pdf>

<sup>10</sup> Ibid

The chart below shows the distribution of FY 2018 ABQ Ride passenger trips by mode. Notably, over 95 percent of all passenger trips are supported by local and Rapid Ride routes, whereas commuter and paratransit services form a comparatively small share of overall ridership.

**Figure 4-14: Albuquerque Ride Transit Trips by Mode, 2018**

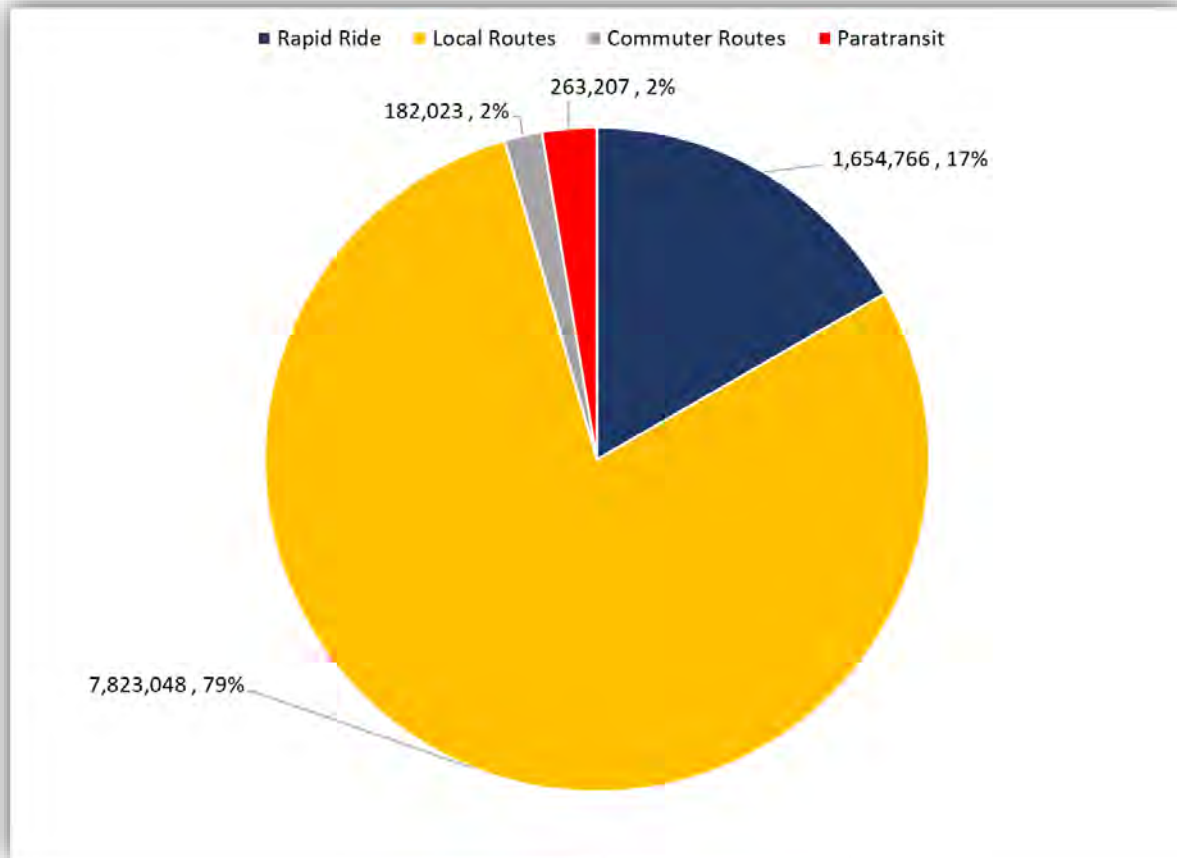


Figure 4-15: ABQ Ride Service Locations and Operations

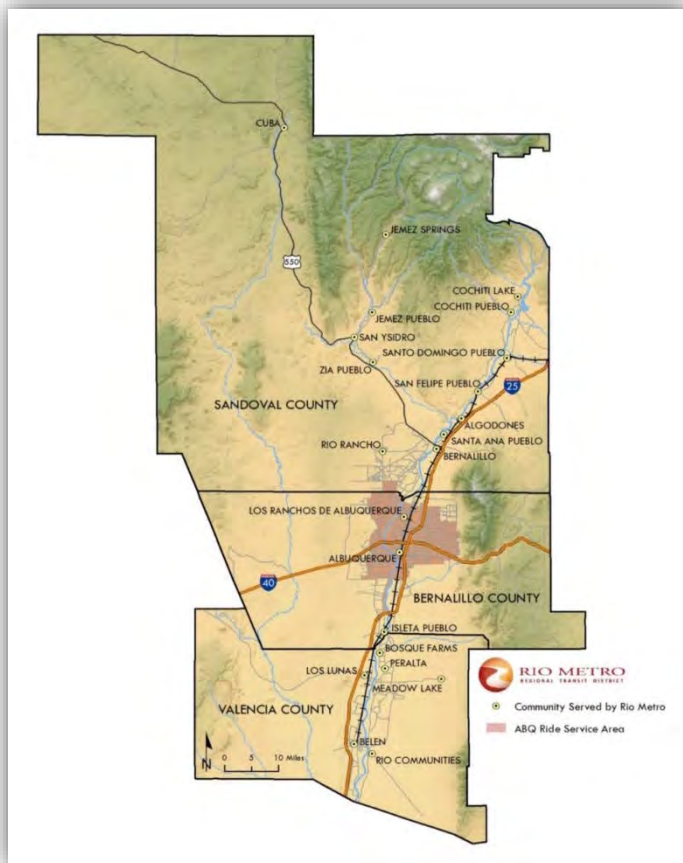




### ***Rio Metro Regional Transit District (RMRTD)***

Another reason for the dramatic growth of transit in the AMPA is directly attributable to the development of the Rail Runner and the creation of the Rio Metro Regional Transit District (RMRTD), or Rio Metro. Rio Metro traces its origin to the New Mexico legislature's passage of the Regional Transit District Act in 2003 and its authorization in 2004 allowing transit districts to levy up to a 1/2-cent gross receipts tax. Subsequently, in 2005 the Mid-Region Transit District was created and later renamed the Rio Metro Regional Transit District in 2008. That same year, Bernalillo, Sandoval, and Valencia County voters passed a 1/8-cent gross receipts tax, one-half of which was solely dedicated to funding the New Mexico Rail Runner Express, which the State of New Mexico was responsible for developing in the early and mid-2000s.

**Figure 4-16: Rio Metro Service Area**



Rio Metro provides several transit services throughout the three-county region, some of which Rio Metro assumed from local agencies following passage of the gross receipts tax.<sup>11</sup> As such, Rio Metro's combination of intercity, urban, suburban, and rural services, while uncommon to most transit providers, establishes a far-reaching and regional transit network that complements ABQ Ride.

Rio Metro services include:

- **New Mexico Rail Runner Express**: The Rail Runner is a commuter train that operates on 97 miles of track and connects several communities, including Belen, Los Lunas, Isleta Pueblo, Albuquerque, Sandia Pueblo, Town of Bernalillo, Kewa Pueblo, and Santa Fe.
- **Nine commuter routes**: Five commuter bus routes connect Sandoval County communities to the U.S. 550 Rail Runner station. Four commuter routes in Valencia County serve Belen and Los Lunas, and two commuter routes in Bernalillo County link surrounding communities to Albuquerque.
- **Dial-a-Ride**: Rio Metro provides Dial-a-Ride

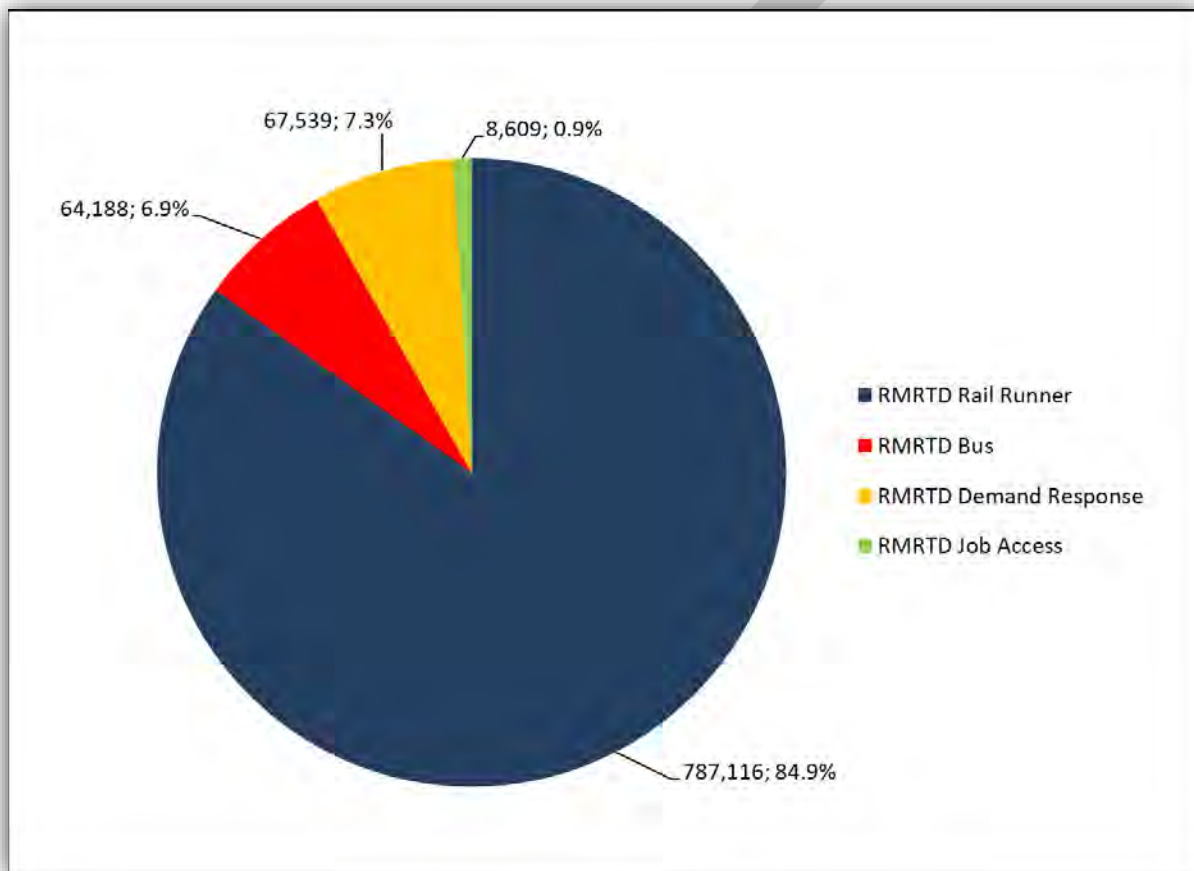
curb-to-curb transit to persons traveling within most of Valencia County and to senior citizens or disabled residents in Rio Rancho. Similar to paratransit, a trip must be requested one day in advance.

<sup>11</sup> Reflecting the jurisdictions it serves, Rio Metro is governed by a Board of Directors comprised of 19 elected officials from Albuquerque, Belen, Bernalillo, Bernalillo County, Bosque Farms, Corrales, Los Lunas, Los Ranchos de Albuquerque, Rio Rancho, Sandoval County and Valencia County. The Board of Directors may exercise powers granted by the Regional Transit District Act, including the authority to determine routes and schedules, issue bonds, establish fares, request an increase in the gross receipts tax by the voters, and adopt a budget.



- **Community Transportation:** The Community Transportation program (previously Job Access and Reverse Commute) provides taxi rides and/or bus passes to Temporary Assistance for Needy Families (TANF), low-income, senior and other individuals with disabilities living in Bernalillo County who have limited transportation options to access work or job training opportunities.
- **Intergovernmental services:** Rio Metro funds routes operated by ABQ Ride, including the 790 Rapid Ride. Rio Metro also provides funding for the New Mexico Department of Transportation's Route 500, a park-and-ride service that connects Albuquerque, and the NM 599 Rail Runner Station in Santa Fe with Los Alamos.

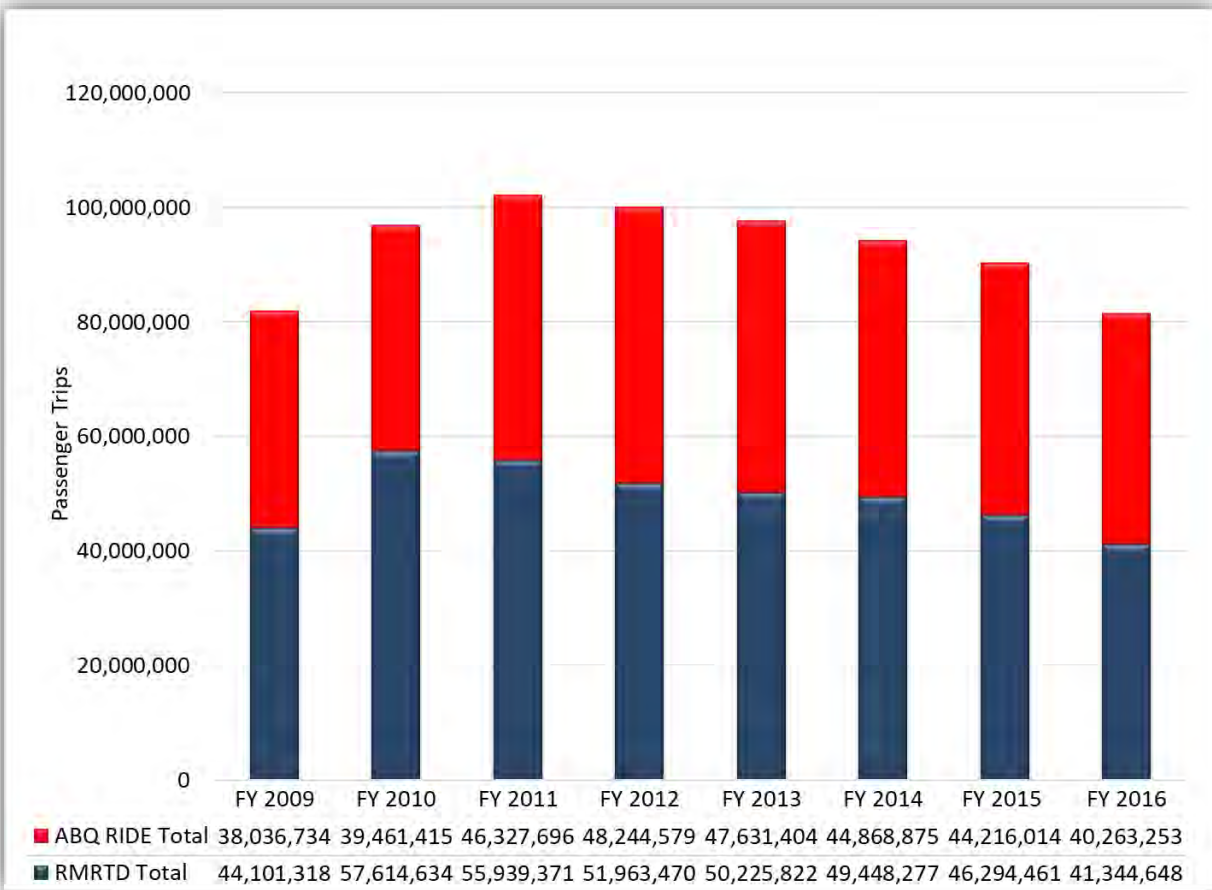
**Figure 4-17: Rio Metro Systemwide Passenger Trips, 2018**



#### *Passenger Trips and Miles Traveled*

In total, Rio Metro provided 927,452 passenger trips in FY 2018, excluding ABQ Ride trips attributable to Rio Metro funding. The Rail Runner accounted for 85 percent of those trips, followed by Dial-a-Ride services (7.3 percent), commuter buses (6.9 percent), and Community Transportation (one percent). When compared to ABQ Ride, Rio Metro carried approximately one-tenth the riders in FY 2017; however, passenger trips are not the sole measure of transit use. In 2018, ABQ Ride passengers logged 35,124,037 passenger miles traveled while Rio Metro riders logged 37,976,104 passenger miles traveled, most of which were generated by the Rail Runner.

**Figure 4-18: Rio Metro and ABQ Ride Passenger Miles Traveled, 2008-2016**



### ***Paratransit Services***

The Americans with Disabilities Act of 1990 requires that transit agencies providing fixed routes, such as ABQ Ride's Rapid Ride and local routes, also offer "complementary" and "comparable" paratransit service to persons with disabilities. ABQ Ride's Sun Van paratransit provides door-to-door service in Albuquerque and portions of Bernalillo County for riders who have satisfied eligibility requirements. Per federal requirements (49 CFR 37.131), paratransit service must be provided:

1. At least three-quarter miles from any fixed route
2. During the same hours and days as the fixed route
3. For a fare no more than twice the comparable fare of the fixed route
4. Based on reservations made the previous day
5. With no restrictions on trip purpose or the number or trips

### *Access for Elderly and People with Disabilities*

Paratransit provides crucial access to the elderly and people with disabilities. The importance of paratransit is likely to grow considering Americans aged 65 or older are set to increase from 15 to 20 percent of the nation's population by 2030<sup>12</sup>. The popularity of paratransit service has grown steadily since the passage of the ADA paratransit mandate, with transit agencies spending a collective \$5.2 billion in 2013, or 12.2 percent of transit costs nationwide<sup>13</sup>. In 1998, paratransit service accounted for only 3.2 percent of total transit expenditure. **The passage of the ADA Act of 1990 did not provide additional funding to transit agencies to help them comply with this mandate.**

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<sup>12</sup> <https://wagner.nyu.edu/rudincenter/2016/09/new-report-intelligent-paratransit#>

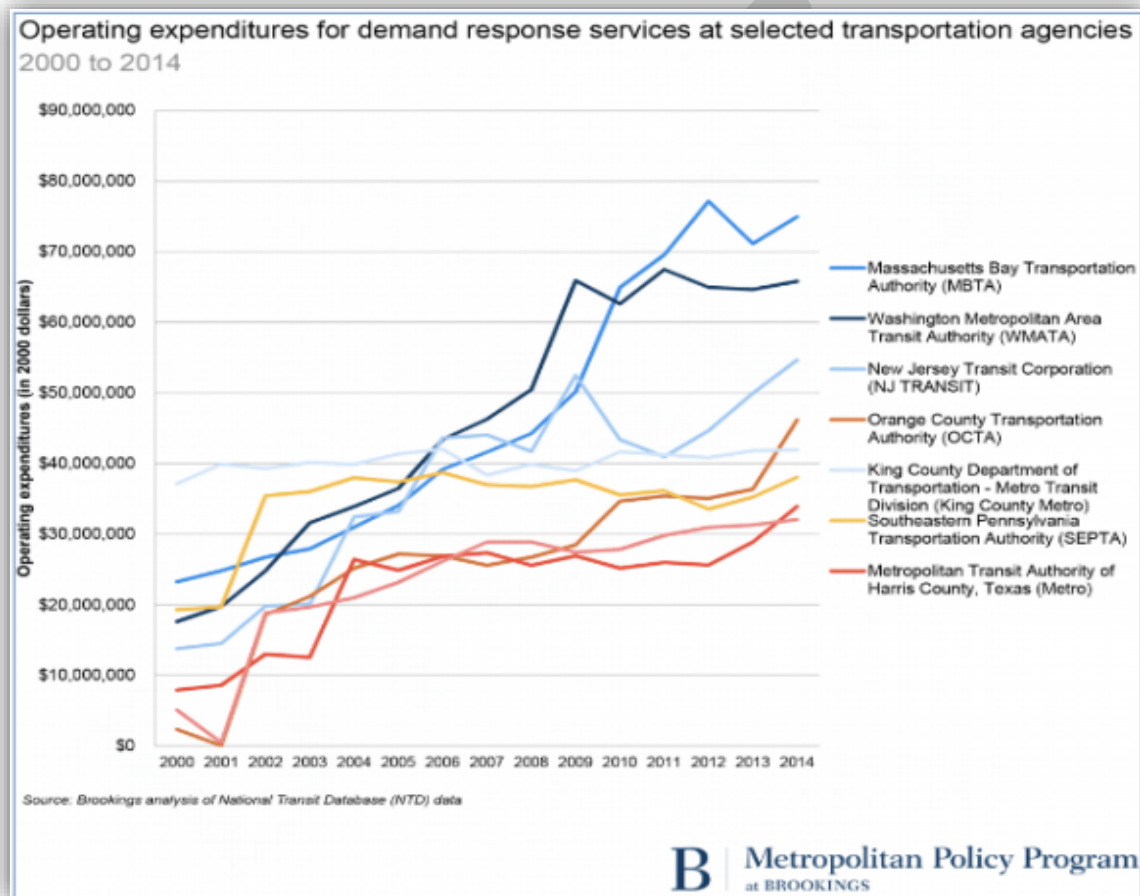
<sup>13</sup> <https://www.brookings.edu/research/how-lyft-and-uber-can-improve-transit-agency-budgets/>

### Cost of Paratransit

The U.S. Government Accountability Office found in a 2012 report that a paratransit trip costs, on average, \$29.30, or roughly 3.5 times as much as an average fixed route trip<sup>14</sup>. The same report also found the average cost of a paratransit trip had gone up 10 percent between 2007 and 2010. These numbers pose a troubling problem for transit agencies across the country. Transit providers must make do with the same operating costs despite the rising cost of meeting paratransit needs.

**Figure 4-19: Operation Expenditures for Demand Response Services**

Source: Brookings Institute



Many agencies want to improve service by providing later run times or new routes, but doing so would also increase their paratransit liability, making such expansions financially impossible. Paratransit provides a crucial service to people in need of transportation. Paratransit should be invested in and made as efficient for users as possible. Moving forward however, more operational funding for transit providers is crucial to meet growing paratransit demand and increase the reliability of fixed route services.

<sup>14</sup> [https://wagner.nyu.edu/files/rudincenter/2016/09/INTELLIGENT\\_PARATRANSIT.pdf](https://wagner.nyu.edu/files/rudincenter/2016/09/INTELLIGENT_PARATRANSIT.pdf)



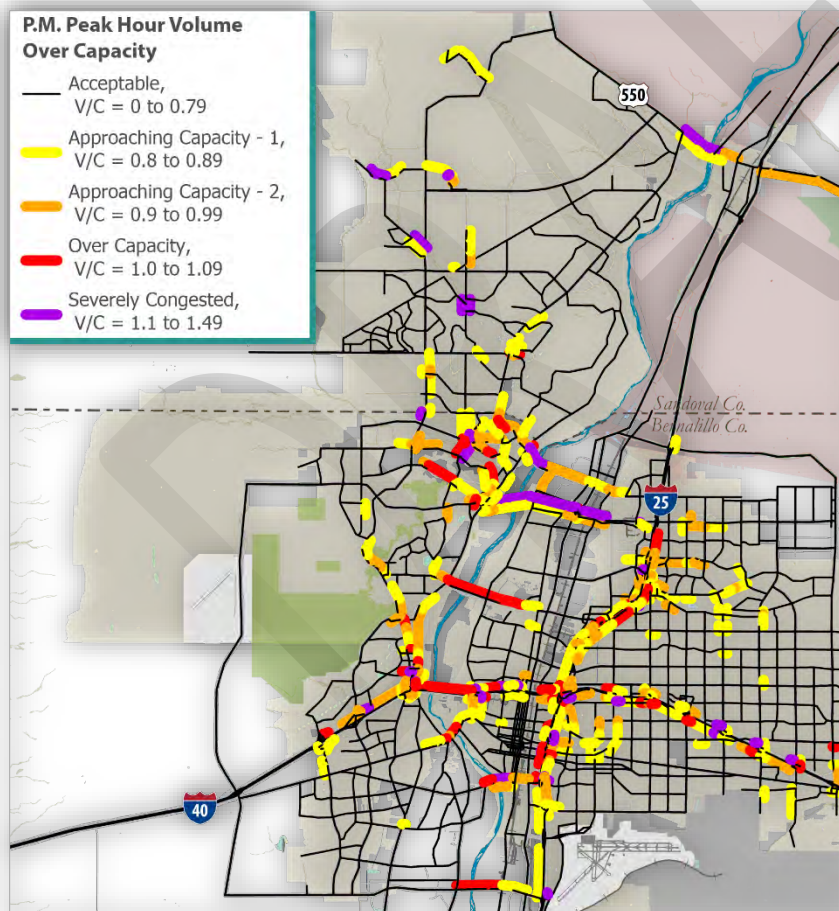
#### d. Transit Supportive Development

Transit service enables the type of compact land development envisioned in the Target Scenario. More compact land development helps reduce vehicle miles traveled in the region by bringing a wide array of destinations closer together. Reducing peak hour VMT is a stated goal of the FAST Act, and it calls out transit as a key strategy to reduce VMT<sup>15</sup>. With the region's river crossings experiencing severe peak hour congestion, shifting people from cars to transit will be a key strategy to ease congestion.

##### ***Housing and Jobs Imbalance***

While the imbalance in housing and jobs is projected to improve slightly by 2040, growth and land development patterns may exacerbate congestion at river crossings. The Westside remains characterized by low-density residential development served by a hierarchy of streets that tend to concentrate traffic on a few arterials, rather than a grid network that more equally distributes traffic. By 2040 many Westside arterial streets are anticipated to exceed capacity during peak hours, whereas the arterial grid network east of the river remains largely within acceptable limits.

**Map 4-11: Snapshot of the Travel Demand Model**



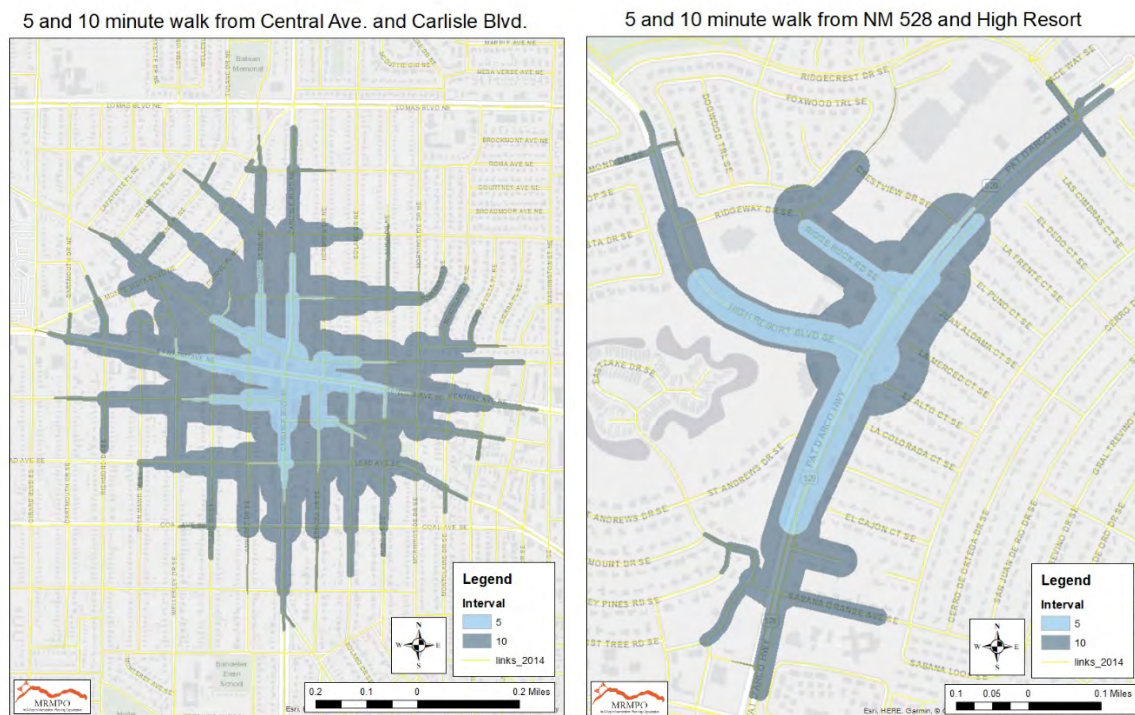
Ultimately, this pattern of low-density development discourages cost-effective, local transit service in much of the region. As the footprint of the Westside continues to grow, it expands ABQ Ride and Rio Metro's service areas, and has the potential to dilute the level of service to existing areas if additional revenue is not generated to support this growing population and geographic area.

<sup>15</sup> <https://www.fhwa.dot.gov/fastact/factsheets/metropolitanplanningfs.cfm>

## Poor Connectivity

Additionally, low-density residential development with poor pedestrian connectivity limits the number of individuals living within a walkable distance of a transit stop (desirably ¼-mile). Thus, a bus must travel farther in this circuitous setting to reach the same number of riders that it might reach in higher-density neighborhoods aligned along a more linear corridor (A longer route also requires more buses to maintain the same frequency as a shorter route, which exacerbates operating costs). Furthermore, a bus operating in ever-increasing congestion will experience declining average speeds. As average speeds decrease, and a bus takes longer and longer to complete its route, more buses will be required to preserve frequency. If additional buses cannot be supplied to offset increasing travel time, frequency will decrease, and ridership may decline.

**Figure 4-20: Impacts of Poor Connectivity**



## What does Successful Transit Look Like?

Implicit in these observations is a common theme in this MTP: land use patterns, densities and road connectivity are some of the strongest determinants of single-occupancy vehicle congestion *and* the viability and success of transit. This is evidenced by the fact that ABQ Ride's most successful local and Rapid Ride routes, located along the Central Ave and I-25 corridors and within the near Northeast Heights, serve major activity centers such as Downtown, Uptown, UNM/CNM, and Journal Center with relatively high employment and population densities. This synergy is bolstered by the presence of an urban street grid and many neighborhoods that are home to more transit-reliant populations. Conversely, it is generally inefficient to extend local bus service to low-density residential areas such as the Westside and far Northeast Heights.

**Nevertheless, such an assertion raises a common dilemma: should transit providers strategically locate services (spend money) to maximize ridership—often times to the detriment of less transit efficient locations—or should they strive for consistent geographic coverage throughout their entire service area, regardless of performance?<sup>16</sup> How do we best address equity and river crossings in this dilemma?**

In the case of serving Westside neighborhoods, ABQ Ride has tried to balance ridership and coverage by offering some local routes, limited commuter routes, and the popular 790 Rapid Ride to connect northwest Albuquerque and Rio Rancho homes to Eastside jobs. In effect, this approach targets the less transit-dependent demographic that has the option to drive, while not ignoring the inherent inefficiencies of the Westside's development patterns.

### ***Target Scenario and Transit***

The Target Scenario envisions higher density development along major corridors and connecting key centers throughout the region. Reliable transit service is crucial to for developing and supporting building higher density, residential, business, and leisure space mixed-use areas. Building higher density usually means relaxing parking requirements and relying on other forms of space-efficient transportation such as transit and walking. Many cities are relaxing zoning restrictions that control minimum parking requirements or height restrictions to support higher density areas. The type of development that supports transit and transit ridership is called Transit Oriented Development, or TOD.

### ***Transit Oriented Development***

Transit Oriented Development (TOD) refers to the creation of compact, mixed used, and walkable communities focused around high quality transit connections<sup>17</sup>. These types of communities can reduce driving by residents up to 85 percent<sup>18</sup>. Allowing dense, mixed use development around transit stations increases the number of potential transit riders as well as destinations that can be easily reached using transit. For TODs to occur, local governments must encourage it through land use planning, zoning laws, and changes to building codes.

### **e. Transit Service Expansion**

In response to the high levels of congestion projected in previous MTPs and limited funding for new major roadway investments, the Metropolitan Transportation Board (MTB) adopted mode share goals in 2010 through Resolution 10-16 MTB that prioritized transit's role in offsetting congestion at river crossings. By 2035, the MTB desired that transit account for 20 percent of all river crossing trips. The resolution also targeted funds available through the Transportation Improvement Program (TIP) to achieve this goal.

Specifically, the resolution required that **"25% of sub-allocated federal funds beginning in 2016 be programmed for capital improvements that implement new or improved Bus Rapid Transit or other premium transit modes as identified in the 2035 MTP."**

### ***Transit Priority Investment Network and Mode Share Goals***

As a proactive step during the drafting of the *Futures 2040 MTP*, the MTB realigned the transit mode share goals to better support the principles of the Target Scenario. For example, because the previous goals focused solely on increasing mode share at river crossings in the AMPA, a project such as the UNM/CNM BRT along University Blvd (which does not cross the river) was ineligible to receive funding set aside to achieve those goals despite its high-ridership potential and value to the region.

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<sup>16</sup> A more in-depth analysis of this issue is presented in Jarrett Walker's *Human Transit*, published in 2012 by Island Press.

<sup>17</sup> <https://www.transit.dot.gov/TOD>

<sup>18</sup> <http://www.tod.org/>

The MTB Resolution 15-01 passed in January 2015 still includes a 20 percent transit mode share goal by 2040 and the allocation of 25 percent of STP-U and CMAQ<sup>19</sup> funds but now more meaningfully focuses those funds on an expanded priority network shown below. Current mode shares are also provided in the Table.

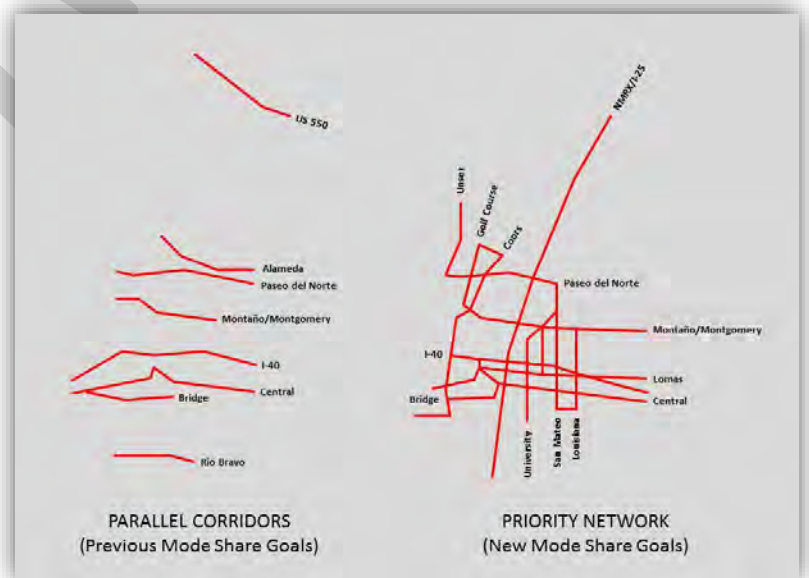
**Table 4-6: Mode Share for Selected Corridors<sup>20</sup>**

| Corridor                    | Avg Mode Share | Peak Mode Share | Peak Link Location                |
|-----------------------------|----------------|-----------------|-----------------------------------|
| Bridge Blvd                 | 1.2%           | 1.9%            | Isleta-8th                        |
| Central Ave                 | 13.1%          | 20.2% / 29.6%   | Washington-San Mateo / 6th-8th    |
| Coors Blvd                  | 2.4%           | 4.6%            | Paseo del Norte Interchange       |
| Jefferson St                | 0.8%           | 1.4%            | Alameda-Paseo del Norte           |
| Lomas Blvd                  | 6.9%           | 12.8%           | 2nd-3rd                           |
| Louisiana Blvd              | 4.0%           | 8.9%            | Uptown-America's Parkway          |
| Montgomery Blvd             | 2.0%           | 3.2%            | Carlisle-Jefferson                |
| Montaño Rd                  | 1.1%           | 1.5%            | Edith-Renaissance                 |
| San Mateo Blvd              | 2.7%           | 5.5%            | Kathryn-Zuni                      |
| Interstate 25 / Rail Runner | 2.4%           | 3-4% / 7.5%     | Belen-Rio Bravo / North of US 550 |

#### *Priority Investment Network Geometric Changes*

An even more fundamental reason for this change is a function of geometry. The previous mode share goals supported a series of parallel corridors that did not intersect (river crossings). However, the new mode share goal supports a potential frequent network that more closely aligns with the Target Scenario and facilitates connectivity between routes and activity centers. Instead of targeting east-west river crossings indiscriminately, the new network focuses on key river crossings where the application of transit is most practical, congested corridors, and major activity and employment centers that attract riders.

**Figure 4-21: Previous and Revised Network Comparison**



<sup>19</sup> STP-U and CMAQ are federal funding categories programmed through the Transportation Improvement Program (TIP).

<sup>20</sup> Some of the corridors included in the priority network are not listed in the table because service on those corridors does not currently exist.



Stated another way, it is not enough for a rider to get across the river—which is a significant barrier that cannot be ignored—but also to their desired destination. The AMPA’s future transit network must accomplish both. The Albuquerque Rapid Transit project along Central Ave is the first beneficiary of this revised policy—bringing to bear both local funds and federal funds derived from the transit mode share set aside to compete for and complement Federal Transit Administration Small Starts funds. In later years, the UNM/CNM BRT could likewise be the next logical recipient for set-aside funds based on the relative priority that Rio Metro’s Board assigned to both projects. Nevertheless, Resolution 15-01 MTB is structured so that the priority network may be revised during each MTP cycle (every five years) to reflect the AMPA’s evolving transit needs.

### *Operational Funding Challenges and CMAQ Funds*

These additional TIP funds counterintuitively highlight the greatest challenge to expanding transit service in the AMPA: operational funding. The federal funds that R-10-16 MTB target, specifically STP-U and CMAQ, are primarily available for capital improvements, such as the acquisition of land for and the design and construction of new park-and-ride lots and Bus Rapid Transit systems. Although these funds are critical for matching other local, state, and federal sources when implementing new services, they are not authorized to sustain long-term operations.<sup>21</sup>

At the time the R-10-16 MTB target was passed, the region was in non-attainment for air quality, and MRMPO was given a portion of the state’s CMAQ allocation to program in the Transportation Improvement Program (TIP). However, the region is currently in attainment, and therefore is not allocated a dedicated portion of the state’s CMAQ funding to program. Therefore, the MTB resolution to program 25 percent of funding to transit projects only applies to STP-U funding.

**Labor, fuel, maintenance, vehicle replacement and administration are the primary determinants of a transit system’s on-going expenses, and, over the long term, can outweigh the capital investments required to introduce new services. Also, investments in long-distance and/or low-ridership routes generally result in higher operating costs.**

Presently, both ABQ Ride and Rio Metro are utilizing all available revenue sources to operate existing services. Any new service such as a new route, or increasing the frequency of an existing route, would require either the elimination or restructuring of existing services, or an additional sustainable revenue source. The efficiency of that service would likewise affect the efficacy of any new revenue source.

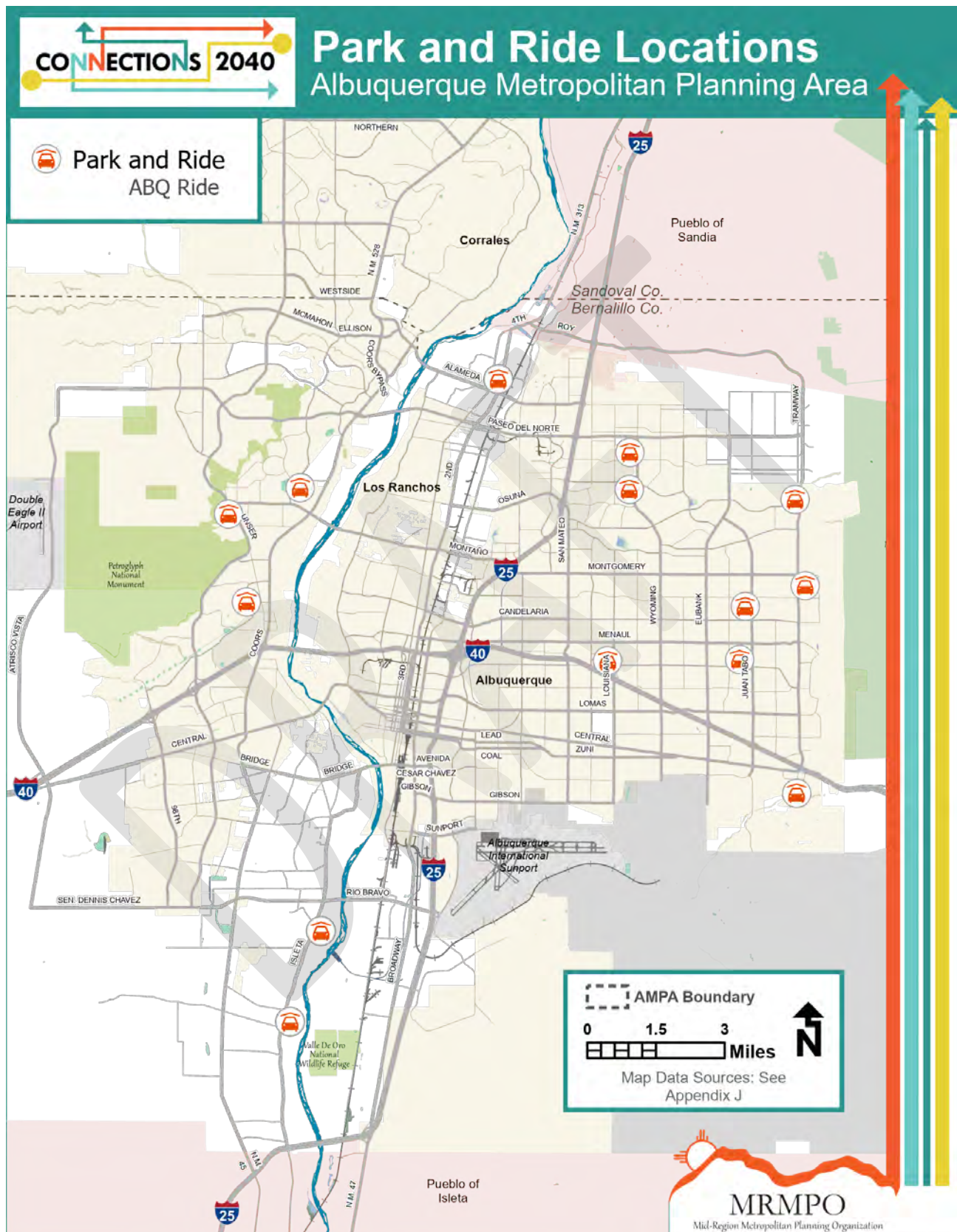
### *Park and Ride Opportunities*

Park and ride lots offer a valuable transportation alternative especially for those who live in suburban or rural areas far from transit service. Park and ride lots are parking areas next to transit stations that allow people to park their cars and ride transit into the city center. This reduces congestion on the most critical roadways leading to job centers. There are park and ride lots at several Rail Runner stations, enabling long distance commuters the option to more easily take the train. ABQ Ride has several park and ride locations at transit centers. Two locations specifically cater to Westside residents looking for a transit alternative to driving downtown or to UNM. The map below shows ABQ Ride park and ride facilities. The black icons indicate park-and-ride facilities at transit stations, and the blue icons indicate parking lots along transit routes that can be used to park and ride.

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<sup>21</sup> CMAQ funds may be used for startup operational costs, but must be replaced by other funds in later years.

Map 4-12: ABQ Ride Park and Ride Locations-DRAFT



## **f. Future Transit Network and Services**

### ***Future Transit Networks***

#### ***Priority Investment Transit Network***

The Priority Investment Transit Network discussed already is focused on a network of transit corridors with high ridership potential that are eligible to receive funding set aside by Resolution 15-01 MTB. These routes were established during the previous MTP. These routes serve dense parts of the Albuquerque metro area, and regional decision makers and staff believe they could reach a 20% mode share by 2040. This network does not designate what type of service exists on which streets, it only indicates regional corridors that have high current transit ridership and land use density.

#### ***Target Scenario Transit Network***

In addition to the Priority Investment Network there is a Target Scenario Transit Network, which largely reflects the Priority Investment Transit Network, but was developed using potential future service and highlighting specific routes that would support regional centers of the Target Scenario developed through the scenario planning process, and the guiding principle of supporting transit oriented development. These core bus routes have at least 15-minute frequencies and were developed in contrast to a Trend transit network as a part of the development of the Economic Fiscal Calculator tool discussed in Chapter 6.

#### ***Long Range Transit Network***

The Long Range Transit Network is an aspirational transit network that is not fiscally constrained and captures how the AMPA's overall transit network could feasibly grow in the region. This transit network is akin to the Long Range Roadway System and the Long Range Bicycle System. This transit network is expansive and includes routes that serve areas that are not necessarily dense and have less frequent service. Therefore, this network includes more defined types of service like BRT, Rapid Ride, Primary, Secondary, and Tertiary types of bus routes and services.

### **Transit Funding Challenges**

As plans and projects continue to recommend and investigate future transit services, new sources of operating funds would be required. However, both ABQ Ride and Rio Metro's operating budgets are at capacity, with very little room to provide additional service in response to demographic pressures. Rio Metro's operating budget for FY 2018 (excluding reserves) is \$40,964,290. The Primary source of local funding is a 1/8<sup>th</sup> cent gross receipts tax, which is currently estimated to generate \$25.5 million per year. Federal funds comprise the largest share of the remaining funds. ABQ Ride's FY18 budget of \$52,200,921 depends heavily upon several local sources supplemented by federal funds.

#### **Long Range Transit Network**

In support of the 2040 MTP scenario planning efforts, and as an attempt to understand how the region's transit network could plausibly grow, a conceptual transit network for the year 2040 was developed that incorporates new projects and enhancements to existing services – and ties them to a proposed revenue source. If community leaders and voters desired to make a greater investment in transit, Rio Metro's remaining 3/8-cent gross receipts tax (GRT) capacity is likely the most appropriate funding source. Based on current receipts, such an increase would generate approximately \$76.5 annually. For the purposes of this analysis, Rio Metro's services, excluding the Rail Runner, and ABQ Ride's Sun Van paratransit received additional funding (\$14.8 million) proportionate to their share of the combined 2018 operating budgets of ABQ Ride and Rio Metro. This would allow operations in Valencia and Sandoval Counties to accommodate

anticipated growth and assumes that paratransit demand will increase as the population both ages and ABQ Ride's fixed-route service area expands under the Target Scenario.

In the Long Range Transit Network, the Rail Runner receives less than its proportionate share (\$15.8 million) of revenue for several reasons. First, no major extensions of the Rail Runner or similar rail projects are proposed in the AMPA. Instead, efforts to expand operations would focus on increasing frequency and capacity by adding cars to existing trains, express trains during peak commuting hours, and mid-day service. Also, much of the funds would support the construction of capital projects that emphasize efficiency, such as siding and centralized traffic control systems that would both reduce delay and allow trains to operate at higher speeds. Both of these strategies have the potential to bolster ridership.

The remaining balance of revenue (\$46 million) was provided for expanded bus service and an additional BRT line generally aligning with ABQ Ride's existing service area. The rationale for this distribution is not so much based on this area's disproportionate share of the population (and, consequently, tax revenue generation); rather, the Albuquerque area has the proven potential to provide the greatest return in terms of both ridership and service efficiency. This allocation essentially values ridership without sacrificing coverage throughout the region.

In addition to the distributions noted above, approximately one-fifth of the funds committed to each service type were withheld to fund vehicle replacement and maintenance of capital assets; thus, any new services funded by the gross receipts tax increase would be sustained by that same source. In reality, additional Federal Transit Administration (FTA) formula funds would likely defray some of these costs.

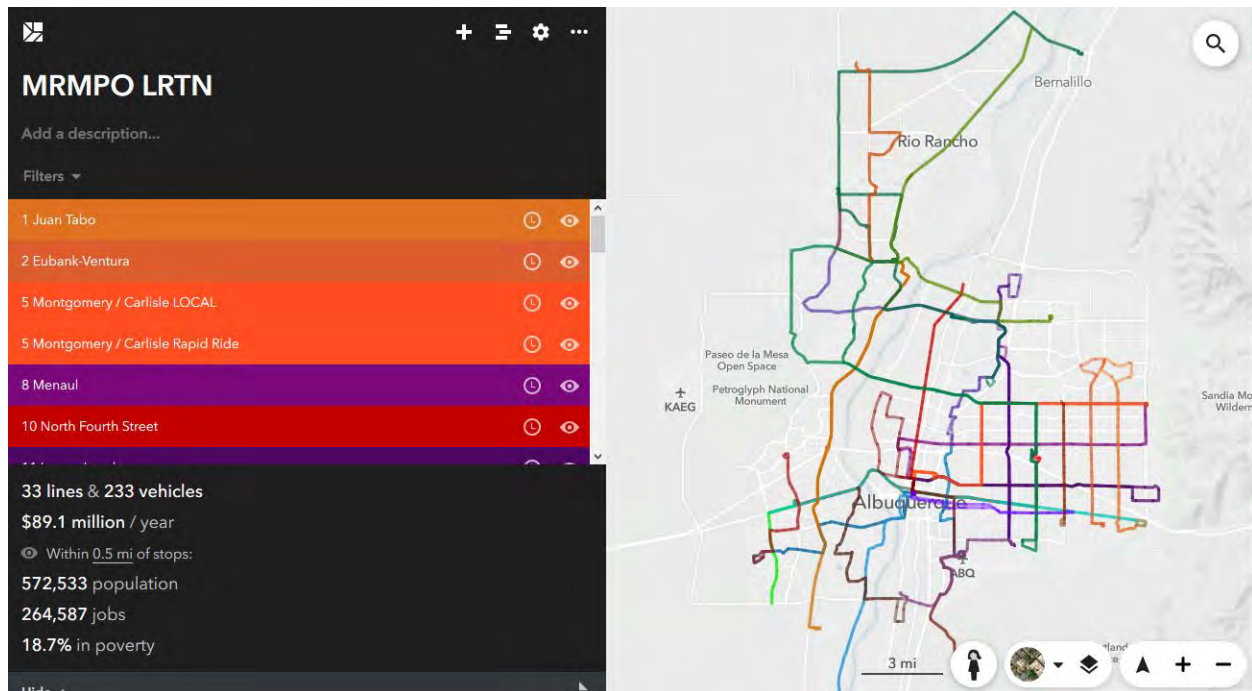
Based on those assumptions, MRMPO updated the previous MTP's "conceptual transit network", which is referred to in this MTP as the Long Range Transit Network. Rio Metro and ABQ Ride staff were consulted on updating the network as well as the Land Use and Transportation Integration Committee at MRMPO.

### **Remix**

Once an updated Long Range Transit Network was agreed upon, MRMPO staff used Remix, a web hosted transit planning application, to create a model of the transit network in order to gain an idea of how much such a system would cost and how many residents and businesses would be reached by the service. Remix allows planners to plot lines representing transit routes and design schedules, the application then estimates how long a bus would need to navigate the route and how much it would cost with the assumption 1 hour of bus operation costs \$100.



**Figure 4-22: Screenshot of Long Range Transit Network Model Remix**



The LRTN was modeled with peak headways of 7-15 minutes for the BRT and Rapid Ride services, 15 minutes for primary routes, 25 minutes for secondary routes and 35 minutes for tertiary routes. The modeled network would cost \$89.2 million annually, which could be met with the additional \$46 million generated annually by a 3/8<sup>th</sup> cent GRT tax.

If this network were built, 573,533 residents and 195,638 jobs would be within a half mile of a bus stop. 387,709 residents and 210,561 jobs would be within a half mile of a high frequency bus stop (15minute frequency or higher).

The 2040 Long Range Transit Network (LRTN), as shown on Map 4.13, comprises an approximately 103 percent increase in vehicle revenue hours over the 2018 transit network through the provision of the following services:

- One additional BRT service operating at 7 to 15-minute headways is proposed in the 2040 LRTN update. In the last MTP, there were four proposed BRT routes, one on Central Avenue was constructed, and 2 were downgraded to Rapid Ride services
- Five new Rapid Ride routes that operate at 7 to 15-minute headways and four of the services interline with local services on the same corridor
- There are ten “primary” local routes with 15-minute headways and service until midnight. There are two new primary routes since the last MTP, one new Primary route was created (98<sup>th</sup> St.) and another was bumped from a secondary route to a primary route (North 4<sup>th</sup> St.)
- Increasing the frequency of 16 “secondary” and “tertiary” routes and expanding their coverage beyond ABQ Ride’s existing service area
- Extending the span of between 17 and 19 hours for BRT, Rapid Ride and Primary routes, and 16 hours for secondary and tertiary routes

The Long Range Transit Network should be viewed as a rough approximation of what is possible. Were this analysis to come to fruition, a far more detailed planning and modeling exercise incorporating public input would be necessary. For example, the simple method employed to develop the 2012 baseline and 2040 future transit networks incorporated many assumptions or limitations that a more robust effort would refine.

### ***Seattle's Success Story***

Transit use is not only declining in Albuquerque, it is in decline across the country. A small handful of American cities are bucking the trend and increasing transit ridership. The most impressive example of this is the City of Seattle. Seattle, one of the fastest growing cities in the country, has increased its overall transit use by 11 percent in the last ten years<sup>22</sup>. Despite a 19 percent growth in jobs and a 20 percent growth in population, Seattle has reduced the use of single occupancy vehicles. The number of people entering downtown Seattle has shifted away from single occupancy vehicles and towards transit, walking, biking, and carpooling. The bulk of the shift has been shouldered by transit, with 48 percent of commuters entering downtown via transit in 2017, up from 42 percent in 2010. Driving alone into downtown fell from 35 percent in 2010 to 25 percent in 2010.<sup>23</sup>

#### ***How Did Seattle Accomplish this?***

In 2014, Seattle voters approved the Seattle Transportation Benefit District Proposition 1 (STBD) to fund an expansion in transit service as well as programs to increase ridership throughout the city. This proposition is funded with a 0.1 percent sales tax increase and a \$60 license fee<sup>24</sup>. These revenue sources generate roughly \$50 million a year for six years between 2014 and 2020. Since 2015, 6,780 weekly bus trips have been added in Seattle.

The Seattle Transportation Benefit District investment in service expansion and increased bus frequency has Seattle close to reaching a key transit goal of the city, which is to have high frequency bus service (10-minute or less headways) within a 10-minute walk of 72 percent of the city's households by 2025<sup>25</sup>.

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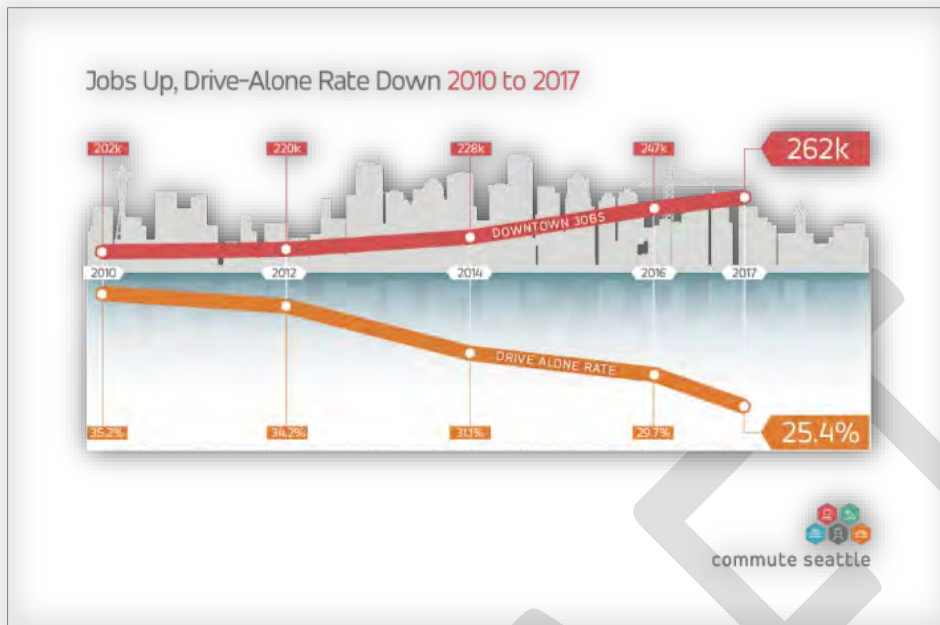
<sup>22</sup>[https://www.seattle.gov/Documents/Departments/SDOT/TransitProgram/STBD/2018STBDAnnualReport\\_FINALv2.pdf](https://www.seattle.gov/Documents/Departments/SDOT/TransitProgram/STBD/2018STBDAnnualReport_FINALv2.pdf)

<sup>23</sup> <https://commuteseattle.com/modesplit-2017/>

<sup>24</sup> [https://www.seattle.gov/Documents/Departments/SDOT/TransitProgram/STBD/2018STBDAnnualReport\\_FINALv2.pdf](https://www.seattle.gov/Documents/Departments/SDOT/TransitProgram/STBD/2018STBDAnnualReport_FINALv2.pdf)

<sup>25</sup> *ibid*

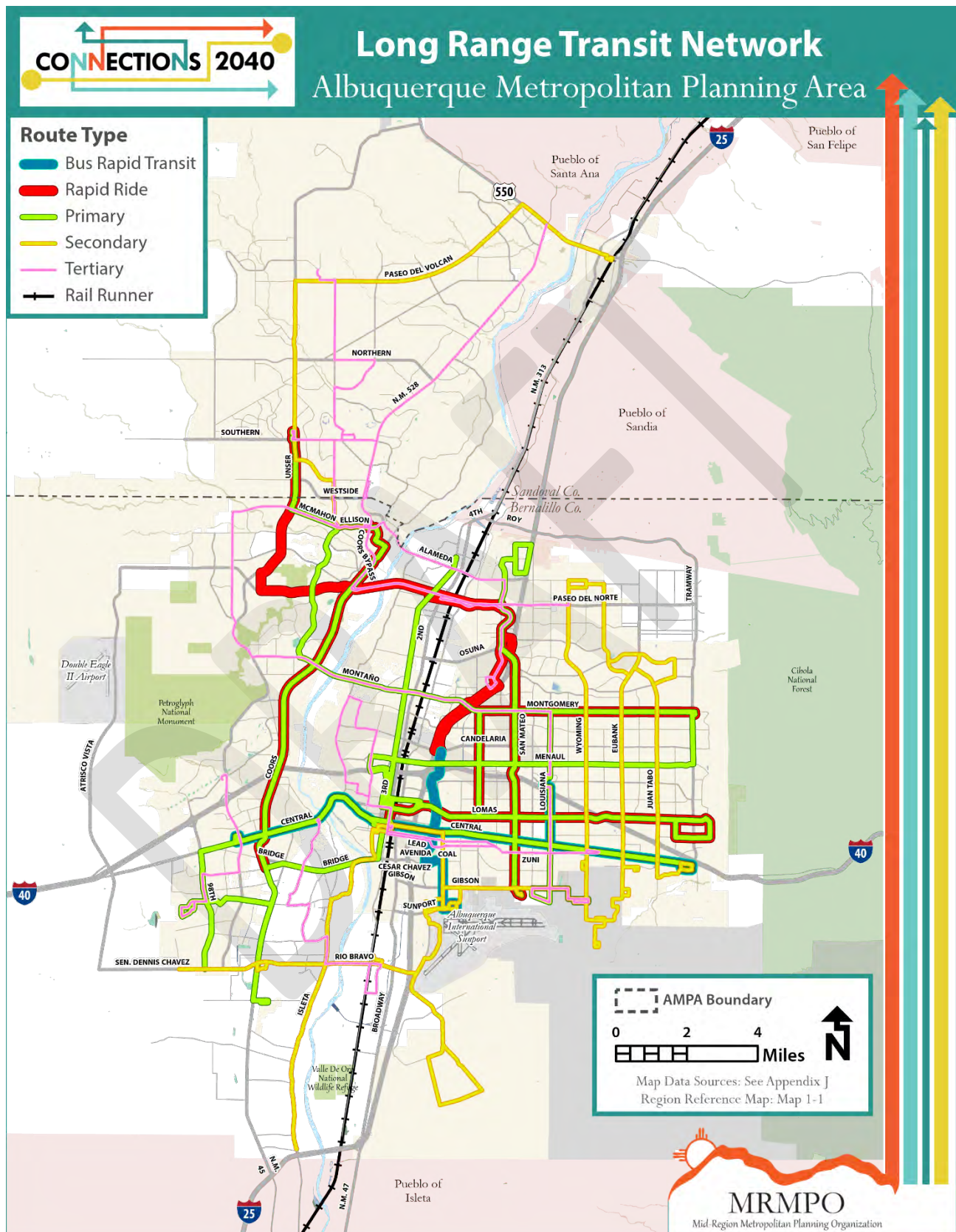
**Figure 4-23: Commute Seattle Drive Alone Percentages**



In 2015, only 25 percent of the city’s households were within a 10-minute walk of high-frequency bus service, and after only three years of investment in service expansion, 67 percent of Seattle’s households were within a 10-minute walk of high frequency service. The Seattle Transportation Benefit District also devotes money to subsidizing transit passes for youth and low-income families and improving on time service. Clearly, Seattle has proven that investing in transit service provision leads to gains in ridership.

Transit ridership in the Albuquerque Metropolitan Area rose explosively between 2005 and 2012, then dropped precipitously between 2014 and 2018. The experience in the Albuquerque Metro Area mirrors that of Seattle in that when major investments were made to improve transit service in the mid-2000s (such as in ABQ Ride’s Rapid Ride and Rio Metro’s Rail Runner) ridership climbed.

Map 4-13: Long Range Transit Network





## 4.3 Transportation Systems Management and Operations

As defined by the FHWA, **TSMO is a set of integrated strategies that focus on operational improvements that can maintain and even restore the performance of the existing transportation system before any extra physical capacity or widening is needed.** It is a valuable strategy to mitigate congestion since it emphasizes the fact that improved roadway operational capacity is often more than the addition of new lanes. Many factors contribute to smooth, reliable, and safe traffic flow, including multi-agency coordination and management strategies such as coordinated management of arterials through corridor analyses, freight coordination, work zones, real time roadway conditions and traveler information, and incident management. TSMO strategies such as these should be implemented before committing to the high cost of roadway widening.

### a. Congestion Management Process

Roadway congestion negatively impacts the quality of life of many Albuquerque residents. Fortunately, congestion is not an all-day phenomenon in most of the Albuquerque metropolitan area. It is generally confined to river crossings and major corridors in the peak periods, although low speeds and long delays are increasingly common in parts of the metropolitan area where there are few transportation options, other than driving, and few routes to select due to a lack of an efficient grid system. Rather, the fact that congestion is not yet a widespread or all-day phenomenon provides the AMPA with an opportunity to ensure smart transportation decisions are made before the congested conditions projected in the 2040 Trend Scenario come to fruition.

#### ***Federal Regulations***

Federal regulations require that all Transportation Management Areas (TMAs), such as MRMPO, incorporate an “objectives-driven performance-based” Congestion Management Process (CMP) into regional transportation planning efforts, and can be seen as the planning element of TSMO. In practice a CMP is intended to assess the performance of the regional multimodal transportation system, identify the sources and extent of congestion, recommend appropriate strategies to manage congestion and improve mobility, and consider the benefits of proposed transportation projects and travel demand management programs. The CMP therefore fulfills an implementation role for the MTP by convening technical experts from member agencies across the region to enable better decision-making and prioritize the projects that will have the greatest regional benefits.

#### **CMP Requirements**

- Identify congested locations
- Determine the causes of congestion
- Develop and propose mitigation strategies
- Evaluate the impact of congestion management strategies on recently implemented projects

## ***Understanding the Congestion Problem***

How congestion is understood is evolving. Specifically, there is a growing body of research that points to the relationship between economic activity and congestion, and that the cities with the highest gross domestic product (GDP) per capita also tend to have high levels of vehicle delay.<sup>26</sup> Research has found that a region's economy is not necessarily negatively impacted by traffic congestion, and that economic productivity and jobs are both positively associated with high levels of traffic congestion<sup>27</sup>.

**In fact, localized congestion may even be beneficial for businesses, or at least is a by-product of activity and an indication of the desirability of a place.<sup>28</sup> Congestion metrics are also rightly criticized for comparing travel times to a set of abstract conditions that only exist in pre-dawn hours when few cars are on the roads.<sup>29</sup>**

### ***Vehicle Miles Travelled***

Congestion is not always associated with lack of mobility; it may simply mean that traffic is moving slower than the ideal. This means that congestion is something to be managed rather than eliminated. Trends in vehicle miles traveled (VMT) per capita in the region seemed to plateau before the Great Recession and declined for several years during the economic downturn. VMT per capita has since rebounded, and in 2018, surpassed the pre-recession heights. However, the fact that VMT per capita in the region plateaued between 2003-2006 challenged the notion that economic expansion and increasing VMT per capita are linked. Factors such as high gas prices and worsening congestion may have encouraged mode shift in the mid-2000s. ABQ Ride introduced its Rapid Ride service in 2004 and Rio Metro introduced its Rail Runner service in 2006; both may have contributed to reductions in regional VMT per capita through by providing alternatives to the private vehicle.

### ***Unused Capacity***

Although VMT per capita is on the rise again, there are parts of the Albuquerque metro area where daily traffic volume has been declining at such a steady rate that certain roadways in these areas with lower volumes and plentiful unused capacity may be good candidates for removing lanes and reducing capacity in order to achieve benefits such as improved safety or improved conditions for other modes of travel.

## ***Managing Congestion***

If congestion is to be managed rather than eliminated, congestion management really means identifying the most effective transportation improvements given the existing conditions and available options. In other words, addressing congestion should really be about making the best out of a situation.

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<sup>26</sup> Findings of Eric Dumbaugh, professor of urban studies, Florida Atlantic University, <http://www.citylab.com/commute/2012/06/defense-congestion/2118/>

<sup>27</sup> <https://www.cnu.org/publicsquare/2018/06/06/congestion-can-be-good-study-reports>

<sup>28</sup> Matthias Sweet, "Do Firms Flee Traffic Congestions?" *Journal of Transport Geography*, February 2014

<sup>29</sup> Todd Litman, VTPI, "Congestion Costing Critique: Critical Evaluation of the 'Urban Mobility Report,'" June 13, 2014

**Table 4-7: Recurring versus Non-Recurring Congestion**

| Recurring versus Non-Recurring Congestion  |   |
|--|---|
| <i>Recurring congestion</i> refers to the type of congestion that happens on a regular and even predictable basis. The main causes of recurring congestion are when there are more vehicles than a roadway was designed to handle, or inefficiencies in roadway design and signal timing that result in lower speeds than ideal. According to the FHWA, half of all congestion is recurring. | <i>Non-recurring congestion</i> results from short-term and generally unpredictable events that disrupt vehicle travel. Examples of non-recurring congestion include crashes, disabled vehicles, work zones, adverse weather, and special events. |

### *Operations and Management Approach*

A wide range of congestion management strategies may be called upon to address both recurring and non-recurring congestion. For example, an operations and management approach integrates the use of technology to maximize system performance and efficiency while ensuring safety and reliable conditions for travelers. Other strategies include properly located capacity expansion projects, incident response, access management, and travel reduction (or travel demand management) programs. The ongoing challenge for the CMP is to integrate those strategies into the regional planning process and encourage local governments to implement congestion management techniques in appropriate locations.

### *Data Collection and Performance-Based Planning*

The foundations of CMP are data collection, and MRMPO collects and analyzes a series of data that are designed to measure recurring and non-recurring congestion. The three principal data elements for the CMP include:

- Volume-to-capacity (V/C) ratios – used to compare the observed traffic volume on a roadway segment to the intended roadway capacity
- Speed differential – used to understand travel time and delays associated with roadway segments and corridors based on the difference between observed speeds and posted speed limits or free flow speeds
- Crash rates – frequency of crashes at individual intersections compared to the regional average

Travel time and traffic counts data are available by time of day and can be used to determine whether the congestion is confined to certain times of the day and whether it is the result of a bottleneck or a prolonged stretch of congested traffic conditions. The congestion data serves as a baseline for understanding conditions by location and highlighting the corridors that merit attention.

### *Multimodal Performance Measures*

Federal regulations mandate that MPOs collect multimodal system performance measures as part of the CMP. MRMPO's CMP collects data on transit and non-motorized travel modes through permanent eco-counters on trails and spot counts using a video camera. Such data is critical when determining how meaningful a role these modes play in the regional transportation system. Similarly, questions of whether the region should focus on efficiency improvements or expand multi-modal opportunities can only be better answered with an understanding of how all residents of central New Mexico travel around the region.

## ***CMP Products<sup>30</sup>***

An important part of the CMP is to disseminate data and related analyses to local government agencies. These actions take place through meetings and coordination with the CMP Committee, presentations to local government agencies, and a range of CMP products, including the following:

- CMP Corridor Rankings Table
- “A Profile in Congestion” – a companion document to the rankings table that provides key data and roadway characteristics for each of the corridors on the CMP congested network.
- Strategies Toolkit – a document describing key congestion management strategies and the locations and situations in which implementation is appropriate.
- Strategies Matrix – a tool for member agencies to identify the most appropriate and highest priority congestion management strategies for each of the corridors in the CMP congested network. Although the strategies matrix was developed for use with the Project Prioritization Process, it can be used as a reference by local governments in the development of all transportation projects.
- Various reports and studies completed by MRMPO through the Congestion Management Process are posted on the MRCOG website.

## ***CMP Corridor Rankings***

Congestion data is collected across the metropolitan area on a recurring basis, but additional analysis is performed on the 30 corridors and two Interstate facilities that comprise the CMP congested network. The data is used in the development of a CMP corridor rankings table that indicates the facilities that experience the highest overall levels of congestion. The CMP corridor rankings are also compiled into a biannual document entitled “A Profile in Congestion” and are an important criterion in the Project Prioritization Process. The various data shed light on the nature of congestion for the segments of each corridor and the way the transportation system is utilized:

- For instance, if congestion is the result of high traffic volumes and large numbers of long-distance trips, then appropriate strategies may include reduced roadway demand through transit service expansion, enhancing alternate modes, implementing other travel demand management techniques such as ridesharing or telecommuting, as well as capacity expansion under the right circumstances.
- By contrast, if congestion is the result of delay and slow speeds, then roadway inefficiencies may be addressed through operations improvements such as ITS deployment, the introduction of acceleration/deceleration lanes, or access management which can reduce the number of vehicles or turning movements on a roadway.
- Operations and maintenance strategies such as traffic signal optimization or installation of adaptive traffic signals can be effective for both types of congestion by improving the flow of traffic and increasing speeds, effectively adding capacity by moving more vehicles in the same amount of roadway space.<sup>31</sup>

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<sup>30</sup> All CMP products are available on the Congestion Management Process page of the MRCOG website.

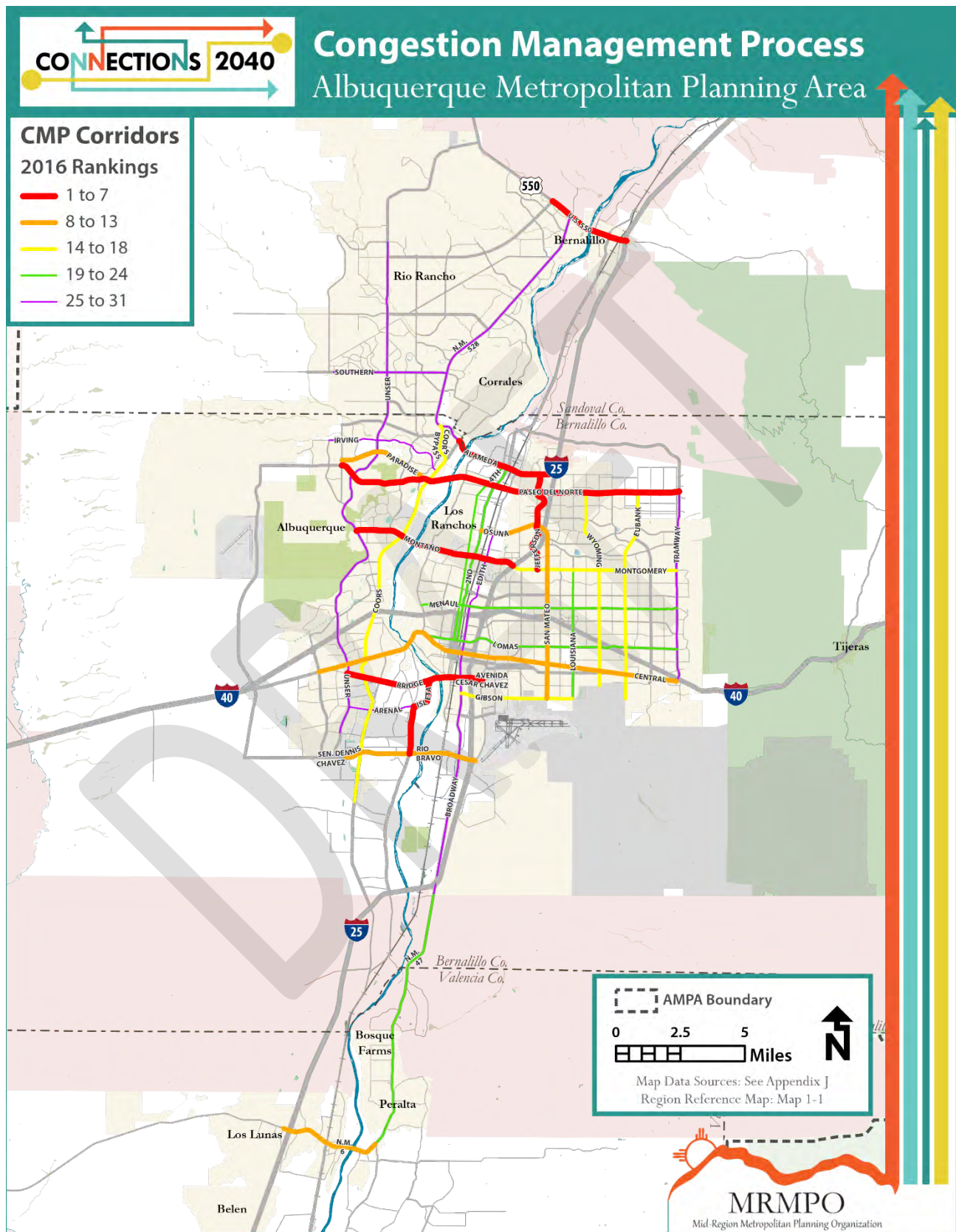
<sup>31</sup> Much of the analysis regarding appropriate strategies and means of quantifying congestion occur with the direct input of the CMP Committee. The CMP Committee is comprised of technical experts from member agencies in the region who meet on a monthly basis to discuss regional approaches and strategies and coordinate efforts between agencies.



**Table 4-8: CMP Corridor Rankings, 2016**

| <b>RANK</b>                            | <b>RTE</b>              | <b>V/C Points</b> | <b>Speed Points</b> | <b>Crash Points</b> | <b>Total</b>   |
|--|-------------------------|-------------------|---------------------|---------------------|----------------|
| 1                                      | ALAMEDA BLVD.           | 67.84             | 21.33               | 1.76                | 90.93          |
| 2                                      | ISLETA BLVD.            | 58.37             | 22.07               | 9.40                | 89.83          |
| 3                                      | BRIDGE/CESAR CHAVEZ     | 57.46             | 20.26               | 11.75               | 89.47          |
| 4                                      | U.S. 550                | 53.21             | 20.23               | 6.71                | 80.16          |
| 5                                      | MONTANO                 | 40.22             | 23.48               | 11.57               | 75.28          |
| 6                                      | PASEO DEL NORTE         | 39.02             | 14.07               | 12.86               | 65.95          |
| 7                                      | JEFFERSON               | 24.23             | 29.71               | 10.25               | 64.19          |
| 8                                      | RIO BRAVO/DENNIS CHAVEZ | 21.21             | 22.77               | 14.10               | 58.08          |
| 9                                      | PARADISE BLVD.          | 31.57             | 10.88               | 14.77               | 57.22          |
| 10                                     | SAN MATEO               | 7.50              | 32.30               | 14.30               | 54.10          |
| 11                                     | N.M. 6                  | 9.73              | 35.01               | 6.71                | 51.46          |
| 12                                     | CENTRAL                 | 12.86             | 25.28               | 11.99               | 50.13          |
| 13                                     | OSUNA                   | 4.21              | 35.45               | 8.55                | 48.21          |
| 14                                     | MONTGOMERY              | 8.64              | 20.74               | 16.04               | 45.42          |
| 15                                     | COORS                   | 11.42             | 18.42               | 15.21               | 45.04          |
| 16                                     | WYOMING                 | 3.92              | 25.42               | 12.09               | 41.42          |
| 17                                     | GIBSON                  | 13.52             | 17.51               | 9.40                | 40.44          |
| 18                                     | EUBANK                  | 10.34             | 18.52               | 11.11               | 39.97          |
| 19                                     | 2ND STREET              | 5.16              | 23.43               | 9.99                | 38.58          |
| 20                                     | MENAU                   | 4.07              | 21.70               | 9.76                | 35.53          |
| 21                                     | LOMAS                   | 0.22              | 26.11               | 7.88                | 34.21          |
| 22                                     | 4TH STREET              | 11.39             | 16.16               | 6.27                | 33.82          |
| 23                                     | N.M. 47                 | 25.86             | 5.35                | 2.35                | 33.56          |
| 24                                     | LOUISIANA               | 1.58              | 17.74               | 13.43               | 32.75          |
| 25                                     | UNSER BLVD.             | 13.26             | 5.81                | 10.82               | 29.89          |
| 26                                     | BROADWAY/EDITH          | 5.63              | 15.43               | 7.83                | 28.89          |
| 27                                     | N.M. 528                | 15.84             | 8.80                | 2.86                | 27.51          |
| 28                                     | ARENAL                  | 3.80              | 12.31               | 11.28               | 27.39          |
| 29                                     | SOUTHERN BLVD.          | 10.53             | 13.27               | 2.69                | 26.49          |
| 30                                     | TRAMWAY                 | 10.86             | 8.26                | 5.44                | 24.56          |
| 31                                     | IRVING                  | 8.22              | 3.20                | 6.27                | 17.69          |
| <b>Sum of points by data input</b>     |                         | <b>591.70</b>     | <b>591.03</b>       | <b>295.44</b>       | <b>1478.18</b> |
| <b>Portion of points by data input</b> |                         | <b>40.0%</b>      | <b>40.0%</b>        | <b>20.0%</b>        | <b>100.0%</b>  |

Map 4-14: CMP Network and Corridor Rankings



## ***Project Prioritization Process***

Integrating the CMP into the metropolitan transportation planning process and into regional decision-making is a critical and ongoing effort. The most significant result of these efforts is the Project Prioritization Process (PPP), which grew out of the CMP Committee's desire to see federal transportation dollars allocated in ways that would have the greatest impact and best address regional transportation needs.

The PPP is an objective, data-driven tool for evaluating transportation projects proposed for inclusion in the short-range TIP and identifying the projects which best address the needs of the region. Many of the criteria in the PPP utilize data analyzed and collected through the CMP, and the CMP Committee oversees periodic updates to the Project Prioritization Process. In particular, the PPP highlights projects that address congested corridors and bottleneck locations. **The greater the severity of congestion or safety risks in the project location – as measured through congested corridor rankings, segment level congestion (based on V/C ratios and speed differential data), and crash rates – the higher the number of points awarded to a project.** The High Fatal and Injury Network (HFIN) is also integrated into the PPP. The HFIN highlights the most dangerous roadway segments in the region and member agencies are encouraged to use the map to develop projects that address safety at those locations. The HFIN map is included in Chapter 5.

## ***CMP Future Directions***

Initial CMP efforts focused on data collection and developing systematic methods for evaluating congestion across the metropolitan area. These methods have largely been completed and put to immediate use through the Project Prioritization Process. The next phase of analysis will be to assess before and after conditions for individual projects on a recurring basis and to better track regional conditions over time. Through these efforts, MRMPO is well-positioned to comply with the requirements for performance-based planning in FAST Act and to provide as much information as possible for member agencies during project development.

## ***New Technologies and Strava Data***

As new methodologies emerge and technology advances, there are also opportunities to expand data collection and transportation-related analysis. Data collection efforts can include a range of alternative mode data, either for specific studies or as part of comprehensive efforts to understand regional bicycle travel patterns and areas of concentrated pedestrian activity. MRMPO buys bicycle and pedestrian volume data from Strava, an app that users can use to track their bicycle rides, runs or walks, usually for recreational purposes. Although this data set does not capture all non-motorized road users, it does help MRMPO get an idea for which routes through the city are popular with people walking and biking. A map of Strava data is included in Chapter 5.

## ***TAQA and Online Based Visualization Tools***

MRCOG's Transportation Analysis and Querying Application tool (TAQA) makes traffic counts and travel time data publicly available and automates the calculation of regional performance measures such as vehicle hours of delay (<http://taqa.mrcog-nm.gov>). Aside from improving the accessibility of data to for users, TAQA allows MRMPO to understand how roadways perform over time and the long-term impacts of infrastructure improvements. Particularly noteworthy is the scope of data available through the tool. Since it can now be collected through mobile devices, regionwide travel data is now inexpensive and comprehensive, and through TAQA can be easily archived and queried. MRMPO staff is continually looking into options for visually displaying data that can be queried and easily used by member agencies and the public when making decisions around transportation infrastructure needs.

[illegible]

other component in the process of providing a reliable transportation

With congestion expected to increase over time, there is a need to complement roadway infrastructure improvements with other efforts to reduce vehicle miles traveled. Travel demand management represents a suite of strategies that can help maintain a viable transportation system and address long-term needs. Under the right circumstances, and particularly when implemented as a set of strategies as opposed to standalone efforts, TDM strategies can help reduce transportation costs for individuals, increase transportation options, reduce peak period congestion and overall travel demand, improve air quality by reducing vehicle emissions, and improve public health by promoting active modes of transportation such as walking, bicycling, and public transit.

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*Draft Connections 2040 MTP*



Regions across the country are creating innovative public and private sector partnerships, introducing incentives, and taking advantage of changing travel preferences to impact transportation patterns. While there are some modest efforts already in place in the region, there is much more that can be done. What follows is a description of TDM strategies, existing activities in the AMPA, and discussion of opportunities to expand the implementation of TDM programs. TDM efforts are consistent with and support the goals of the 2040 MTP for several important reasons, mainly to:

- 1) Help manage congestion;
- 2) Reduce vehicle emissions;
- 3) Improve public health and safety by encouraging more trips to be accomplished through active transportation modes.

### ***General TDM Strategies***

TDM can be thought of as a suite of strategies that are to be applied in different situations and contexts, but when taken together can have an important impact on travel behavior and the region. At its core, TDM is about reducing vehicle miles traveled by encouraging a reduction in vehicle use and altering driving habits. The more viable transportation choices that are offered the more likely people will choose alternatives to driving alone. The challenge lies in creating and ensuring such options exist, in part through investments in transit, bicycle, and pedestrian infrastructure. Physical infrastructure strategies that support TDM efforts that mitigate auto impacts include the provision of High Occupancy Vehicle (HOV) or High Occupancy Toll (HOT) lanes, or parking management strategies that reduce excess parking in some cases and maximize parking efficiency in others.

### ***TDM Programs***

In addition to changes in physical infrastructure, TDM includes organized efforts to change individual travel modes or travel schedules. While programs can be applied at a regional or district level, such as a downtown, many take place in individual businesses or among groups of employers located in places where congestion is particularly problematic.<sup>33</sup> **Often, private sector participation is accomplished through partnership with a government agency or by government requirement.** Program formats vary and can include providing employees with incentives to carpool or commute via transit or bicycle, reduced (subsidized) transit fares, or offering flexible schedules to help employees that can avoid congested times and reduce the number of peak-hour commuters. TDM efforts can be aided using technology to make alternative modes easier to use and reduce unnecessary driving.

### ***Existing TDM Efforts***

Two agencies, the City of Albuquerque's ABQ Ride and the Rio Metro Regional Transit District, are primarily engaged in TDM efforts in the AMPA. Over the years, these TDM efforts have evolved in ways that lend themselves to greater cooperation, particularly as Rio Metro's visioning process may recommend opportunities for integration between Rio Metro and ABQ Ride.

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<sup>33</sup> Washington state law requires urban areas with traffic congestion to reduce single-occupancy vehicle travel and regional VMT by developing travel demand management programs.

## Smart Business Partnership

The Smart Business Partnership is one of the primary TDM programs that both ABQ Ride and Rio Metro employ to engage public agencies and institutions and private-sector business. Essentially, partners are encouraged to provide alternatives to single-occupancy vehicle travel by:

- Allowing alternative work schedules (e.g., telecommuting and flex schedules)
- Subsidizing bus and rail passes
- Promoting the federal commuter tax benefits
- Installing/constructing improvements such as carpool spaces and bike racks and lockers
- Operating shuttles or vanpools or providing fleet vehicles
- Advertising and promoting transit and other alternative modes to access work

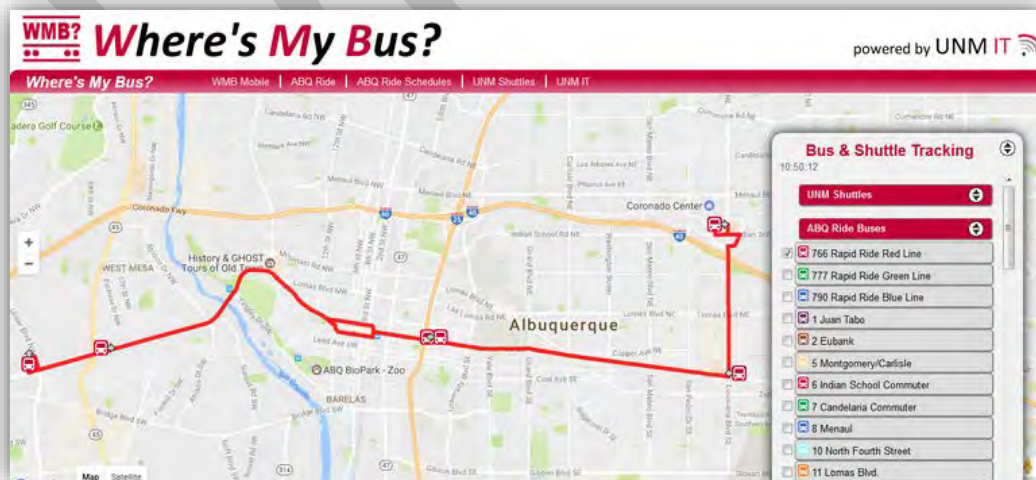
In exchange for their participation, Smart Business Partners receive recognition on transit vehicle displays, and on agency websites and promotional materials. They are also eligible for discounted passes and advertising. **Rio Metro has, for example, engaged over 90 businesses and agencies representing 84,000 employees and 30,000 students through this program.**

One of the most important aspects of the *Smart Business Partnership* is that while it is championed by transit agencies, it allows partners to consider both transit *and* non-transit related TDM strategies. Similarly, ABQ Ride also offers the *Guaranteed Ride Home* program—a form of insurance to non-single-occupancy-vehicle commuters (regardless of mode) if an unscheduled meeting or emergency leaves them unable to use their regular means of alternative transportation to get to their destination.

## New Technology

Technology initiatives are also an important aspect of TDM. Rio Metro introduced a new system in 2015 that incorporates smartphones as a means of ticketing, scheduling, contacting Rio Metro, and distributing important notifications. ABQ Ride's "Where's My Bus" website and corresponding iPhone and Android app are also examples of TDM-funded technology solutions that make trip planning more predictable and the transit system more understandable.

**Figure 4-24: Where's My Bus?**



### c. Intelligent Transportation Systems

Improving the efficiency of the existing roadway network is a major component of the *2040 MTP*. Creative strategies are required given limited funding and the strain placed on many of the region's roadways due to land use patterns and reliance on single-occupancy vehicles. One of the most effective and widely utilized TSMO strategies is ITS, which entails a range of advanced technologies to assist roadway operations staff, and to enhance driver decision making, and improve the flow of travel.

The primary benefits of ITS include; improved traveler information, improved roadway operations safety, a more efficient use of existing roadway capacity, and smoothed traffic flow. ITS-related efficiency improvements are particularly significant because they actively manage and improve a driver's "situational awareness" of conditions "downstream," and thus allow greater throughput travel which effectively adds capacity to the system without building new roads or new travel lanes.

#### ***Regional Transportation Management Center***

A Regional Transportation Management Center (RTMC) is in the final stages of development in the AMPA, and it will be the first in the region to house multiple-agency transportation operations in a single co-located facility. The center will consolidate monitoring and transportation management activities across jurisdictional boundaries, including:

- A single-room video wall comprised of Closed Circuit Televisions (CCTVs) for shared viewing and monitoring of roadway conditions among all agency staff
- Coordinated reporting of speeds and travel times during peak travel periods
- Coordination of emergency response for traffic incidents or other hazards
- Reporting of hazardous travel conditions such as inclement weather, crashes, or construction-ahead notifications

The benefits are anticipated to be substantial. For example, roadway incidents are one of the greatest contributors to congestion in the AMPA. **A Regional TMC that integrates all agencies' roadway monitoring and responses with CCTVs, Dynamic Message Signs (DMS), other monitoring efforts, and the NMDOT's HELP Courtesy Patrols, can shorten response times by as much as 25 percent on the interstates.** The coordination of traffic response is often lacking, but the Regional TMC will improve communication, reduce traveler delays, and improve safety for all users of the transportation system. Construction is currently underway, and the project is anticipated to be completed in the year 2020.

#### ***ITS Regional Architecture and Coordination***

While ITS is implemented by individual member agencies, travel is by nature regional and there is a strong need to coordinate activities among various stakeholders in the AMPA. This is the mission of the ITS Subcommittee. This committee is comprised of planning, engineering, and operational representatives from public sector agencies within the AMPA, to promote and coordinate ITS deployment in the region as well as to manage and maintain the AMPA's Regional ITS Architecture.

The AMPA Regional ITS Architecture serves as a guiding document and is required of each region by the federal government. It outlines regional needs and creates the framework from which to plan, design, deploy, operate, and maintain ITS. The *AMPA Regional ITS Architecture* is now fully integrated with MRMPPO's transportation planning process. This document is updated periodically as part of an ongoing "maintenance plan" (the current version was finalized in 2016) and includes current ITS needs and services and new stakeholders from the 2012 AMPA boundary expansion following the 2010 Census.

### *ITS Subcommittee Role*

The ITS Subcommittee has established a role in the review and sometimes formulation of ITS projects needed and included in the MTP and the TIP. Federal requirements state that any project seeking to utilize federal transportation funds, and which that includes ITS elements or connect with other federally-funded ITS projects, must be consistent with and included in the AMPA ITS Regional Architecture. The group continues to work closely with the Congestion Management Process Committee to apply ITS project planning and technical insight on congested corridors with a strong focus on multi-agency and multi-modal operations. This approach to project programming continues to reduce hurdles that may be caused by cross-jurisdictional coordination issues and will encourage a focus on traffic operations for projects on congested corridors. The ITS applications employed in the AMPA vary in function and are designed to satisfy specific user needs identified through input from member agency stakeholders. Periodic updates ensure that the document remains current with regional and agency projects and priorities, as well as with the National ITS Architecture Standards.

### *ITS Corridors*

The Intelligent Transportation Systems Corridors is a product of the ITS Subcommittee and is updated periodically based on agency and regional ITS priorities. The map identifies specific ITS corridors planned for deployment, making the information accessible to planning and development review communities within the AMPA. This approach has proven effective in broadening awareness of ITS planning in the AMPA by identifying implementation opportunities for a broader range of transportation projects. The ITS Subcommittee further identifies a subset of ITS Priority Corridors that support detailed ITS project development. An evaluation matrix with ITS criteria was developed, using existing ITS deployment status and other suitability measures, to rank need on each corridor based on the most viable and/ or highest value ITS Services. The prioritized corridors are consistent with the CMP and provide additional focus on improvements to critical travel corridors already identified within the AMPA transportation system.

### *Integration with the TIP*

The *ITS Architecture* provides the basis for the ITS Subcommittee's project review performed as part of the TIP two-year programming cycle mentioned above. All projects submitted for the TIP and MTP are evaluated to determine if they include ITS elements, which are then mapped to the appropriate ITS Services. This step ensures integration between projects in the TIP and MTP as well as the guidance set forth in the *AMPA Regional ITS Architecture*. The current version of this document is available on the MRCOG website. All ITS project deployment activity including ITS-specific projects, or other projects that simply include ITS elements, must follow a Systems Engineering process in order to be certified by the NMDOT and Federal Highway Administration. Systems Engineering for ITS involves a methodological approach to ITS project development that focuses on the agency and system needs, and includes advanced technology and communications-enabled roadway operational management strategies. To assist member governments in meeting this requirement, MRMPPO, along with the NMDOT ITS Bureau and Federal Highway Administration, have developed online training resources available through the MRCOG and NMDOT websites.

### *ITS Real-Time Services*

The constant real-time monitoring of roadway conditions and operational management is done either passively using roadside detection, or actively by roadway operator staff in the management centers. This allows staff the ability to display messages and/or alerts on overhead message boards, adjust traffic signal timing for optimal flow, coordinate with agencies and first responders, and provide enhanced information such as travel time, hazardous conditions, or other contributors to congestion. Often an alert is made far enough in advance so that travelers have time to divert to a different route and avoid the congested area entirely.



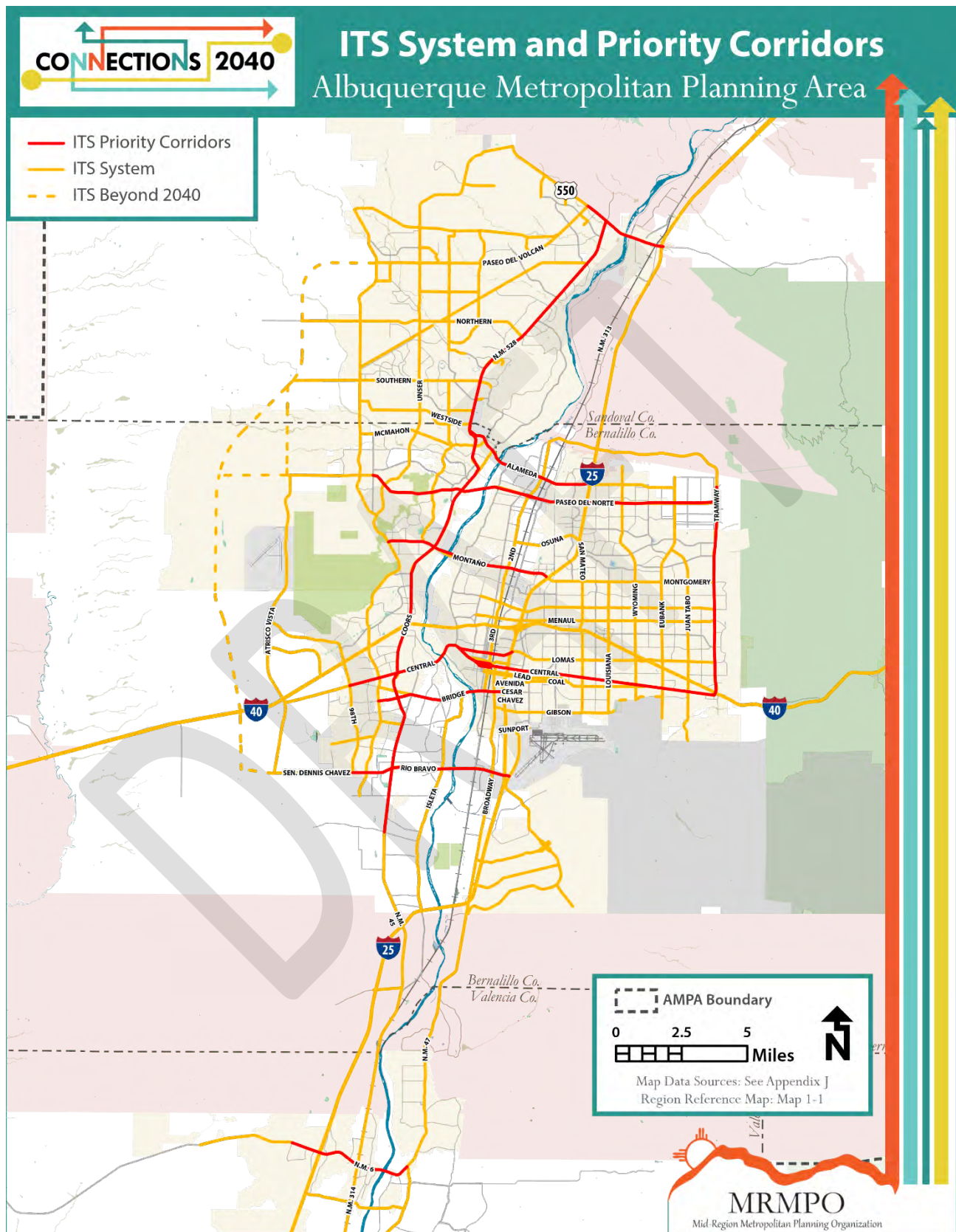
## Essential ITS Services

The primary components of the *ITS Architecture* are referred to as ITS Services. These services are integral to maintaining a safe and smoothly flowing transportation system. Those currently deployed or being considered by member agencies include:

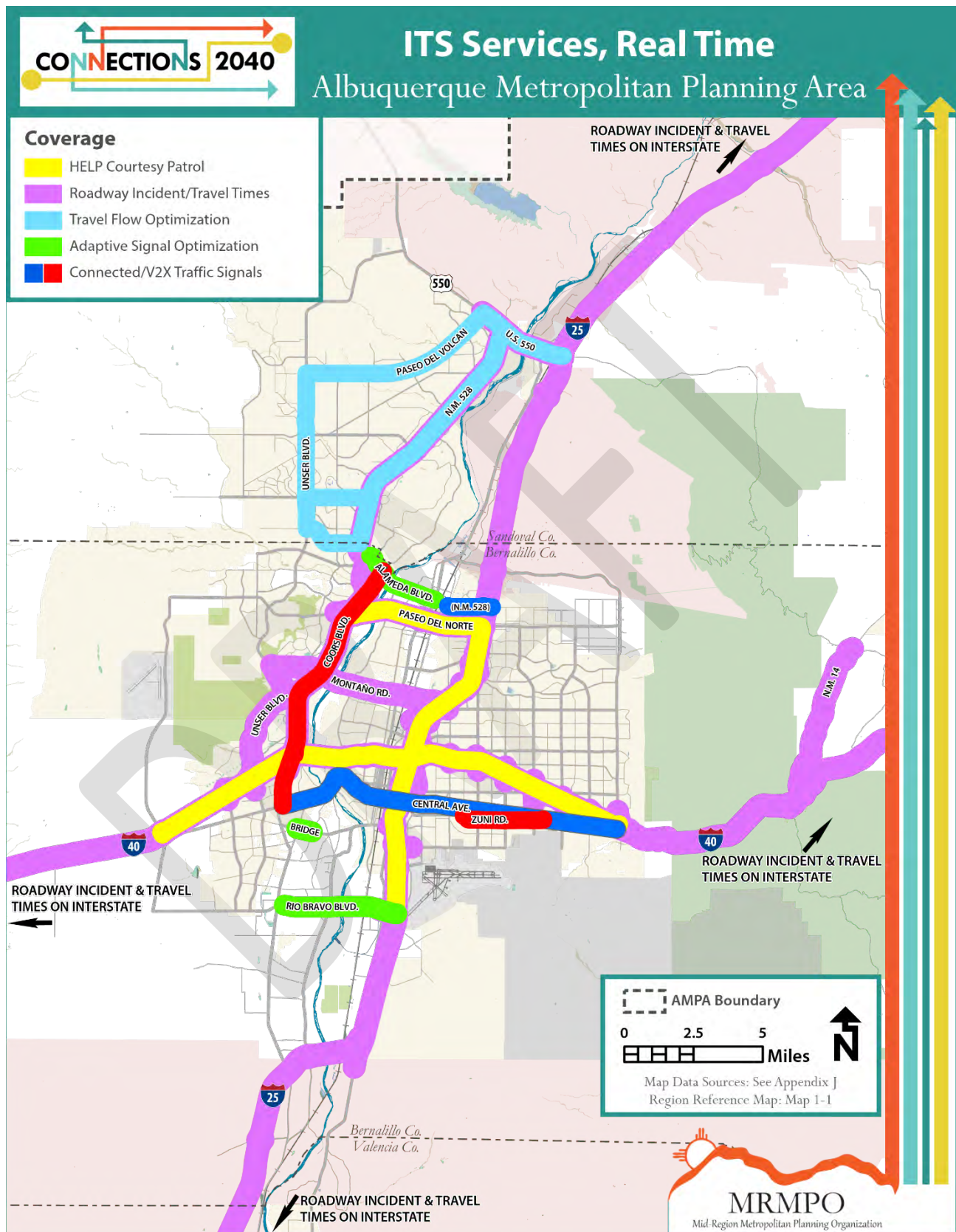
**Table 4-8: Primary ITS Services**

| ITS Services Deployed and being Considered in the AMPA  |
|---|
| <b>Traveler information services</b> provide real-time information on traffic conditions and travel times to motorists on roadways and to transit users on upcoming arrival times. These strategies help to improve traveler decision-making by providing information such as downstream congestion, incidents, travel times, next-bus arrival times, and cautionary alerts from adverse weather conditions. This information is made available to roadside devices, websites, or mobile apps.  |
| <b>Network surveillance</b> systems are those that monitor traffic, transit, and roadway conditions and convey information ranging from travel conditions and alerts for travelers, to system status and performance for managing agencies. Devices include visual tools such as closed-circuit television (CCTV), but also include passive data collection devices like traffic sensors using microwave, inductive micro loops, Wi-Fi, or Bluetooth frequency from mobile devices.   |
| <b>Advanced transportation management and arterial operations</b> systems focus directly on roadway and signal control to improve traffic operations in real time. Typically focused at locations where disruptions may be greatest, they generally result in improved safety and flow.   |
| <b>Regional/local transportation and transit management/dispatch centers</b> bring together many ITS services in one facility to coordinate responses to through adjustments in signal timing, issuing traveler information, and communications with emergency responders. Operated either as a single agency facility, or a facility shared by multiple agencies in the region, they promote data sharing and the coordination of response. Data archiving efforts are also an important step in the ITS planning for operations process and can be streamlined through regional transportation management centers.  |
| <b>Incident and emergency management</b> improves roadway operations by connecting dispatch with network surveillance and traveler information systems, to reduce response times and to ensure that the correct equipment can be dispatched based on actual needs and conditions.   |
| <b>Roadside weather information</b> provides valuable alerts to travelers on the environmental conditions that affect the roadway surface and driving conditions. Information on ambient conditions such as visibility, temperature, wind, and precipitation, as well as road-surface conditions such as ice, moisture, and/or flooding are disseminated via traveler information and roadway maintenance services.   |
| <b>Public transportation operations and management</b> benefits from ITS deployment through services that provide real-time monitoring of transit vehicle operations and dispatch services, trip planning information, and real time bus location/arrival time that is immediately to the user via mobile apps. Transit station security is also supported via the deployment and remote monitoring of surveillance cameras at transit stations.  |
| <b>Commercial vehicle/freight management</b> relies on ITS to ensure efficient movement of truck freight. According to the New Mexico Trucking Association, the traveler information ITS service that alerts truck drivers of hazardous conditions downstream has proven essential to the efficient and safe operation of freight within the AMPA and the State. Further, Automated Vehicle Inspections (AVI) reduces delays with passive inspection-station certification capabilities that allow responder-equipped freight traffic to enter the state and not be subject to costly inspection stops. In effect, a “bypass” of these stations is allowed while adhering to necessary permitting requirements. |
| <b>Workzone/construction management</b> serves to minimize the impacts of construction zones by alerting travelers of anticipated delays, detouring, and other cautionary actions needed to avoid hazards in the construction zone.   |

Map 4-15: ITS Corridors in the AMPA



Map 4-16: Network Coverage of “Real Time” ITS Traveler Information Services





## Seamless Travel Management

Member agencies are continually expanding the deployment of crucial TSMO strategies such as real-time adaptive signal control, Bluetooth, and Wi-Fi enabled traffic operations monitoring, up to the minute traveler information, and alerting systems to notify drivers of downstream conditions and potential hazards. The collective result of these coordinated efforts are the beginnings of a network of seamless travel management that is already providing wide benefits to travelers in the AMPA. All these efforts are crucial to serving the Optimized Mobility needs of a growing region, and it will be imperative for local entities to continue to coordinate in their operational management strategies.

The number of corridors that provide these real-time ITS Services such as travel alerts, courtesy patrols, advanced operations, and optimized flow management at signals has **increased nearly 17 percent since 2015** to a total of over 350 directional freeway and arterial centerline miles. Further, the number of vehicles traveling on corridors with ITS Services has increased by nearly 30 percent.

**Table 4-9: VMT on ITS Corridors with Real-Time Operations**

| Corridors with real time ITS Services, 2012 |           | Corridors with real time ITS Services, 2018 | Percentage Change |
|---|-----------|---|-------------------|
| Centerline Miles                            | 301.1     | 352.1                                       | 16.8%             |
| VMT   | 7,586,443 | 10,779,224                                  | 29.6%             |

## Connected Vehicles

As the ITS Services identified above are employed by local agencies, they are laying the formative groundwork for an integrated deployment that will support advances in vehicle and infrastructure technologies as we enter an age of Connected and Automated Vehicles. Advances in communications and sensors deployed in transportation infrastructure continue to offer huge operational, safety, and quality of life enhancements to the users of the system.

Nearly every auto-manufacturer is offering what are termed Connected Vehicles (CVs) that can communicate with advanced sensors in the roadway infrastructure and which are already beginning to improve travel flow and safety, and transform public agency operations. Typically enabled with advanced Bluetooth and or Wi-Fi communications, vehicles of today can communicate within their surroundings to capture and relay to the driver such things as roadway and weather conditions, speed, proximity to objects or other potential hazards drivers experience in their commutes.

### d. Federal Initiatives and Local Agency Implementation

Local agencies have long recognized the value of TSMO, and the development of management and operational strategies is ongoing. The ITS Subcommittee provides the local forum for ITS promotion and coordination of strategy priorities, and the USDOT has a set of initiatives and programs that provide guidance and support for innovative approaches to operational management. Standout programs for innovative ITS practices and effective operational strategies related to TSMO that are being pursued by AMPA agencies include the Strategic Highway Research Program (SHRP2), Everyday Counts Program (EDC), and the National Operations Center of Excellence (NOCOe), which includes the Signal Performance and



Timing (SPaT) Challenge. All these programs provide tools and products that are being employed by local agencies here in the AMPA.

### ***The Strategic Highway Research Program (SHRP2)***

SHRP2 has been in existence since 2006. It was born out a previous federal transportation bill (TEA21) to create a set of area-specific committees to develop policy guidance in the areas of improved safety, highway renewal, improved reliability, and reduced congestion – all geared toward an improved quality of life. Over 60 products have been developed in SHRP2. An example most notable to local agency efforts include the National Traffic Incident Management Responder Training Program (Train the Trainer), which focuses on developing effective and faster incident clearance strategies to improve safety and reduce delays resulting from congestion. This program brings law enforcement, fire/rescue, towing and recovery, EMS medical personnel, transportation public works maintenance/operations/planning, and other disciplines together to engage in hands on and interactive incident resolution exercises. This program has been embraced by the NMDOT, is supported by ITS New Mexico, and has been used for training first responder personnel in New Mexico. The program has also been adopted by the New Mexico Law Enforcement Academy and the New Mexico Fire Training Academy for accreditation. To date, over 1,100 personnel have become certified through the program.

### ***Everyday Counts (EDC)***

EDC is a state-based model that identifies and promotes the deployment of proven and typically underutilized strategies for improved transportation operation and project delivery. The primary areas of focus are shortened project delivery times, enhanced roadway safety, reduction in traffic congestion, and the integration of automation in transportation. Noteworthy elements supported locally in the AMPA include:

- Adaptive Signal Control (ASC) – Bernalillo County and NMDOT have deployed ASC on several corridors.
- Smarter Work Zones – NMDOT local project-based deployment and a statewide policy is being considered.
- Automated Traffic Signal Performance Measures (ATSPMs) – City of Albuquerque has numerous corridors existing and several are planned.
- Road Weather Management/Weather Savvy Roads - NMDOT ITS and District 3
- Traffic Incident Management – The use of low cost off the shelf technologies for strategies included in the TSM&O/ITS toolbox.
- Crowdsourcing for Operations – The use of mobile-sourced data for operations management is being evaluated by the NMDOT ITS bureau.
- Weather Responsive Management Strategies – Integrated into the NMDOT ITS operations and 511 Road Closure information.

### ***Real Time System Management Information Program (RTSMIP)***

The Real Time System Management Information Program (RTSMIP) requires ITS investments on the interstates to provide real-time traffic monitoring and traveler alerts of roadway conditions. The NMDOT has met this requirement and has fully deployed RTSMIP on interstates and some state-owned roadways using a combination of travel time data collection, CCTVs, RMIS weather stations, FHWA-required 511 traveler information telephone service, DMS, courtesy patrols, and the cloud on the NMRoads.com traveler information website and mobile app. This traffic management environment is utilized by not only the travelers, but also with law-enforcement and fire/rescue to incorporate dispatch communications as well as privileged access to CCTV images. The improvements that will be afforded with a formal Management Information Program will result in significant improvements in roadway operations and safety.

Of critical note is that this requirement is forthcoming for select non-interstate roadways once the Albuquerque Metropolitan Statistical Area (MSA) population reaches one million (the Albuquerque MSA is expected to meet this threshold within the mid-term year of the plan). The AMPA interstates are already in full compliance, and this game-changing innovation forms the core of the regional ITS system and will serve the anticipated expansion of this service to the select arterial roadways, resulting in a further integrated ITS system among the AMPA stakeholder agencies.

### ***National Operations Center of Excellence, NOCoE***

NOCoE is a collective of national transportation entities including the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Traffic Engineers (ITE), ITS America (ITSA), and the National Highway Traffic Safety department under USDOT working through the USDOT's Vehicle to Infrastructure Deployment Coalition (V2I DC). This consortium is interested in advancing new and innovative ways to improve traffic flow and safety with transportation management and operational practices using state of the art technologies including communications, vehicle sensors, and advanced signalization infrastructure. As shown in the CMP, many of our corridors experience congestion due to gaps in advanced infrastructure deployment or management practices.

### ***SPaT Challenge***

NOCoE in coordination with the USDOT has put forth a federal initiative called the "SPaT Challenge", the purpose of which is to promote and support transportation infrastructure owners and operators in the deployment of roadside Dedicated Short Range Communications (DSRC) 5.9 Ghz broadcast radio infrastructure to transmit signal phase and timing (SPaT) data in real-time at signalized intersections. Data include location, speed, and critical operational information of the vehicles, and will support safer and more efficient roadway operations. The communications and messaging will take place both "in-vehicle" with messages and alerts directly to the driver, as well as in the actual operations of the vehicle as the roadside sensors communicate with the vehicle sensors to share data such as approach speed, proximity of other vehicles, and other real-time driving conditions. The initiative is in anticipation of the inclusion of these technologies and capabilities in most new vehicles sold within the next several years. This effort is of interest for our members agencies in their role in building and maintaining the transportation infrastructure needed to support the new and emerging advances in smart transportation.

### *Local SPaT Undertaking along NM 528 and Lead/Coal/Zuni*

The SPaT Challenge has been undertaken in the AMPA by the NMDOT in coordination with the City of Rio Rancho along the NM 528 corridor to include up to 18 signals. The Concept of Operations is in development at the time of this writing that will set forth the details of the project which is anticipated to be deployed shortly after this plan is approved. Further SPaT deployment is being undertaken by the City of Albuquerque on Lead/Coal/Zuni, and study will be underway in the forthcoming year. SPaT corridors are anticipated to support several V2I connected vehicle safety and operational applications, and is initially envisioned to include features related to safety including:

- Pedestrian in Signalized Crosswalk Warning,
- Eco-Approach and Departure at Signalized Intersections (Eco A/D),
- Red Light Violation Warning (RLVW), within the vehicle.

Additionally, SPaT deployments will support the Mobile Accessible Pedestrian Signal System (PED-SIG) application on a mobile device. Many other V2I connected vehicle applications may be developed and deployed locally. Examples of these applications include Signal Priority (transit, freight, other fleet vehicles), Emergency Vehicle Preemption (PRE-EMPT), and Probe-enabled Traffic Monitoring.

### **e. Connected and Automated Vehicles Technology (CAV)**

Although the future will be heavily influenced by CAVs with what is considered by the US DOT as “Next Generation ITS”<sup>34</sup> serious obstacles remain. The CAV uses wireless network and sensors to obtain relevant traffic and other vital information, as well as enhanced driving control using onboard sensors. The current state of the practice in advanced mobile communications includes 4G and 5G networks, Bluetooth, and Wi-Fi; the new requirement for 5.9 GHz Dedicated Short Range Communications (DSRC) sets forth another platform that the innovation sector is addressing head-on.

Recent project development efforts performed on pilot projects have identified that a combination of cellular and DSRC communications might be a more effective approach since mobile communications are more widely adopted and thus offer a higher level of market penetration. This will help resource-strapped local agencies meet the needs of the transportation network.

**Figure 4-25: Connected Vehicle Communication**



Source: <https://www.intellias.com/v2x-basics-connected-vehicle->

<sup>34</sup> USDOT/ITS America Connected Vehicles Taskforce

With the big change in the transportation system ahead, in what many in transportation field are referring to as the “transformative” emergence of CAVs, agencies will need to anticipate needs in infrastructure in order to fully realize the tremendous benefits that CAVs will provide. A summary of what is on the horizon and some key challenges and opportunities we will face is presented below.

### Vehicle to Vehicle Technology

This new and emerging technology is called vehicle to vehicle (V2V), vehicle to infrastructure (V2I), and even Vehicle to Pedestrian (V2P), and is collectively referred to as vehicle to everything (V2X). Examples of V2V include cars themselves sharing information such as speed, approaching hazards, and braking activity of vehicles ahead. V2I involves vehicles sharing communications with devices such as signal controllers, data collection sensors for speed, road-surface condition, and presence of pedestrians in crosswalks. V2P is a specific reference in V2I that focuses on the needs of pedestrian safety. It establishes that portion of communication between pedestrians and the infrastructure that is typically supported with cell phones in combination with the vehicles.

Though CVs with a limited range of capabilities are already on the market, the US DOT and the private sector are moving forward with research, guidance, and applications to help move CVs closer to wide-scale national deployment. The American Planning Association released a report, *Planning for Autonomous Mobility (PAS 592, 2018)* predicting that the earliest year automakers might have a fully autonomous car available to the public is 2020, and that by 2040 approximately 50 percent of cars will be AVs. The report also states that of the 500 largest US cities, only five percent are considering AVs in their comprehensive plans or have in place ordinances pertaining to the safe operation of AVs. Numerous timeline predictions exist, however; it is clear that the incremental adoption of CVs and AVs will continue to be realized within the 2040 planning horizon of the MTP.

**Figure 4-26: DOT’s Connected Vehicle Path to Deployment**



### Interoperability of New Technologies

Though this transition is moving fast, the interoperability of these technologies with the existing roadway systems is key among the still-maturing technology. The USDOT ITS Joint Program Office has dedicated resources to this topic with a focus on interoperability to “ensure effective connectivity among devices and systems” as part of their *ITS Strategic Plan* (USDOT ITS Research 2015-2019, ITS Joint Program Office).

## *Integration with Public Agency Infrastructure*

The integration of new technologies and capabilities to public agency infrastructure is a primary concern of MRMPO, not only for the impacts on our member agencies' budgets and operations, but also in the development of an integrated and efficient multimodal transportation system. Changes in roadway infrastructure can take time as they are subject to local budgets, maintenance and replacement cycles, and limited source funding. The urgency is high for best-practice methods and technologies as we begin to modify our transportation infrastructure with the capability to communicate with vehicles for enhanced operations. Agency risk is always a factor when migrating to any new infrastructure component such as advanced signal controllers or devices installed on the roadside. Agencies must be sure of their effectiveness and the ability to improve the system without liability risk.

## ***Federal Policy and State Efforts on AVs***

Guidance and standards must be established by federal authorities to ensure a level playing field and coordinated uniform adoption of new technology. So far, the federal government and the Federal Communications Commission (FCC) has allocated 75 mhz of spectrum in the 5.9 ghz band for use by ITS safety and mobility applications.

## ***National Highway Transportation Safety Administration (NHTSA)***

The USDOT has designated the NHTSA as the authority on AVs. In 2016 the USDOT issued the *Federal Automated Vehicles Policy* as a proactive approach to providing safety assistance in the development of AVs in recent years. This was followed in 2017 by the *Automated Driving Systems: A Vision for Safety 2.0* as a non-regulatory guide to support the auto industry and key stakeholders with best practices for safety testing with the formalization of levels of automated driving. The USDOT intends that the development and implementation of AVs proceed in an orderly manner to ensure the safety of the traveling public. In October 2018, *Preparing for the Future of Transportation: Automated Vehicles 3.0* was released which expands the scope to all surface on-road transportation systems. This guidance is structured around three main areas:

- Advancing multi-modal safety
- Reducing policy uncertainty, and
- Outlining a process of working with the USDOT for the developers of AVs and states

**The NHTSA has initiated the rulemaking process requiring that by 2023 all cars sold must be equipped with DSRC-based V2V technology.** Current established industry, however, has been developing 5g LTE cellular as it also can be used for personal mobile communications. Currently, some systems combine both communications types and it may well be the case that the future systems include the integration of both. The debate continues with one thing is for certain; cellular-based communications are more widespread than DSRC, and to NOT include them in V2X development might be considered short-sided.

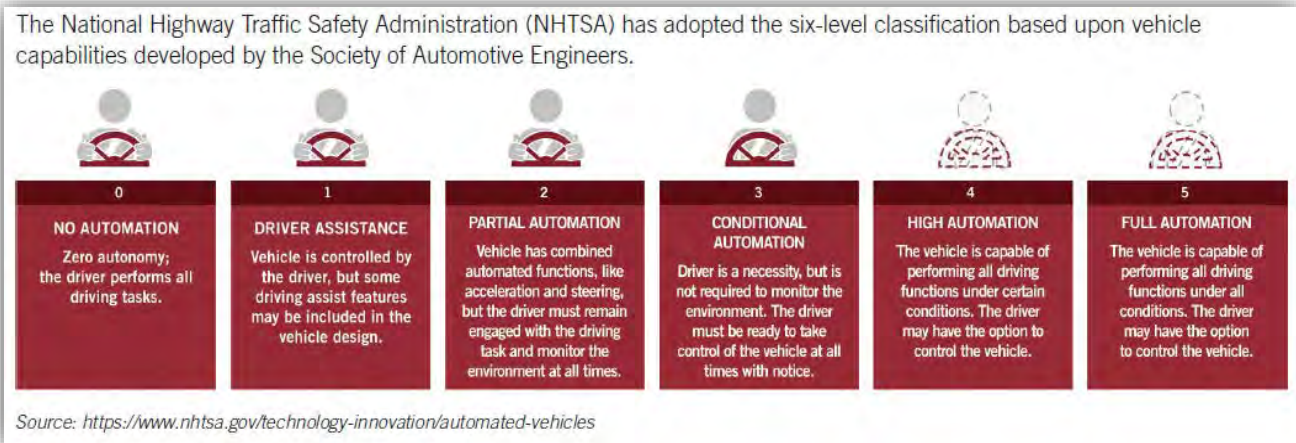
For implementing agencies, a commitment to provide a safe, efficient, and reliable transportation system necessitates robustness and proven applications. To that end, the FHWA has sponsored numerous pilot programs across the country to test the benefits, reliability, and practicality of these new applications. From these studies, a set of best practice examples can be used to support policy and implementation decisions.



## Automation Levels

In 2014, the USDOT through the Society of Automotive Engineers (SAE) has established six levels of automation for AVs ranging from fully manual to fully automated and which correspond to the amount of driver interaction required to operate the vehicles. This standard has been adopted by the industry.

**Figure 4-27: NHTSA Established Automation Levels**



## AV Use in US Cities

A report by the National League of Cities indicates that more than 50 percent of US cities are currently preparing to host AVs in their future. There are current test-deployments across the country, to evaluate different operational scenarios for their effectiveness and applicability of AVs. Most notable include:

- Single occupancy vehicle; app-based rideshares – Pittsburgh, PA, Boston, MA, Chandler, AZ
- Passenger shuttles on, fixed route non-public roads – Arlington, TX
- CA city-run permitting process for various types of AV-related services – Portland, OR
- Shared electric AVs electric integrated with public transit – San Jose, CA

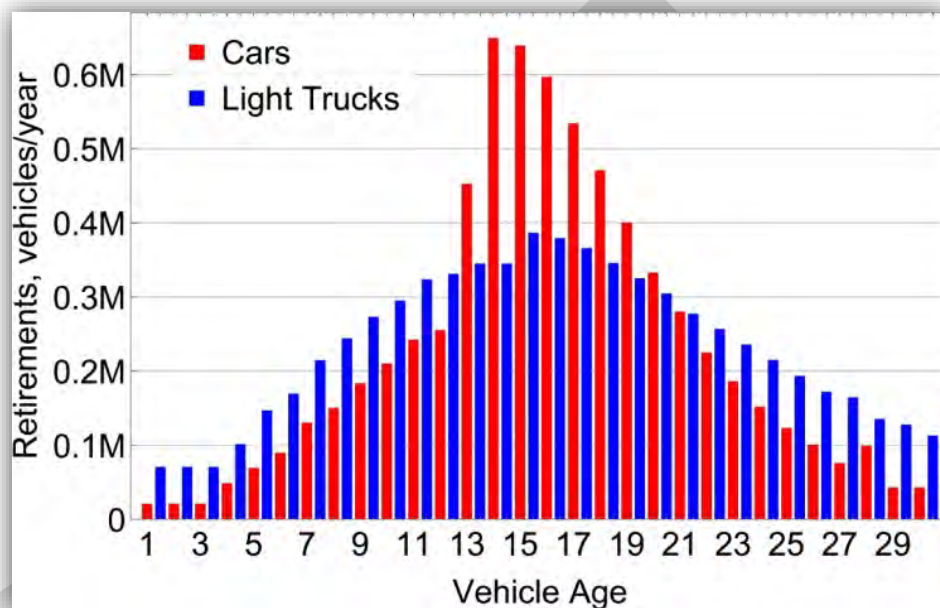
However, numerous issues still need to be addressed before we can expect more widespread adoption. A major factor remains to be the unpredictability of the traveling environment. That combined with safety concerns add to the complexity of widespread AV adoption. However, the technology is in continual development, and with nearly every vehicle manufacturer having developed working prototypes, progress is being made. There is no clear-cut approach to widespread adoption of AVs.

### Fleet Turnover

One factor is fleet turnover or the rate at which older vehicles are replaced by new ones. According to research conducted by the Massachusetts Institute of Technology, the vehicle fleet turnover rate is slowing as vehicles continue to be more durable and last longer, thus making the immediate adoption of an AV in many households less likely. A recent study conducted in 2019 noted that the fleet turnover takes much longer than people expect. Note the distribution for the average vehicle lifetime below, with the average at 19.6 years. Regardless, what is clear is that the future transportation system will involve a change in vehicle type and capability, and will be comprised of a mix of CVs, AVs, and non-connected vehicles.

**Figure 4-28: Distribution by age of Vehicle Replacement for Cars and Light Trucks**

Source: Vehicle Fleet Turnover and the Future of Fuel Economy, Sloan School of Management, MIT, 2019



### AV Progress in New Mexico

The regulatory framework for the implementation of AVs is distributed among federal and state authorities. The federal role focus is on the setting and enforcement of Federal Motor Vehicle Safety Standards (FMVSSs) and enforcement of compliance with FMVSSs (to ensure that the public is advised and educated on these issues). States, on the other hand, are responsible for the licensing of human drivers and registering of vehicles, enacting and enforcement of traffic laws and regulations, safety inspections, and regulating the motor vehicle insurance and liability rules.

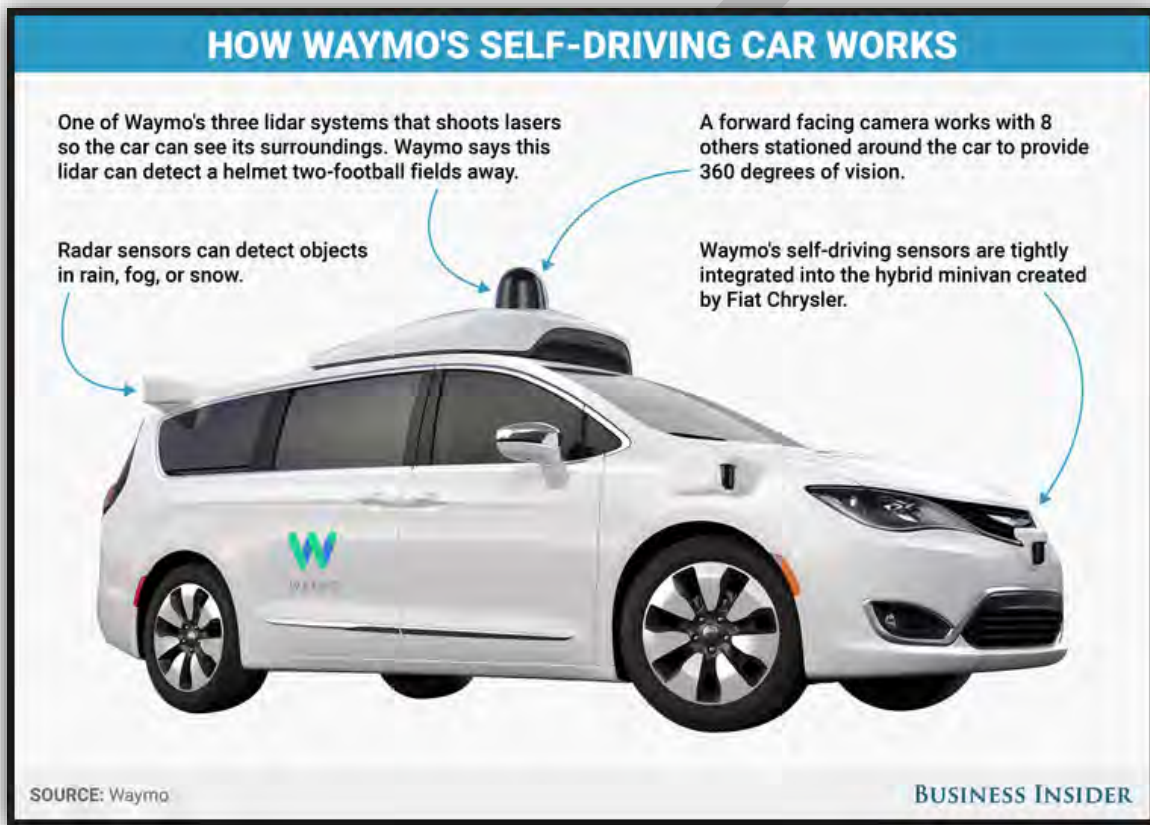
#### State Memorial on AV Use

In New Mexico, efforts have begun to prepare for AVs. The 53<sup>rd</sup> Legislature for the state approved Senate Joint Memorial 3, *Autonomous Vehicle Use in New Mexico* which sets for the process of identifying and addressing issues to ensure the safe and legal operation of AVs on our roadways. The memorial establishes an Autonomous Vehicle Committee, led by the NMDOT, “to review the current and developing technology for autonomous vehicle operation and existing state policy and statutes that many be relevant to autonomous vehicle operations.”

### Autonomous Vehicle Committee

The committee is comprised of representatives from NMDOT, New Mexico Departments of Public Safety, Tax and Revenue, Information Technology, Economic Development, and the Public Regulation Committee, and input from relevant public and private stakeholders. This group is focusing on the requirements and evaluation of current and needed legislation. The insurance industry is involved and has already noted that significant changes will need to be made to fault/recovery rules as AVs enter the driving landscape. With the inevitable transition to Connected or Autonomous Vehicles (CAVs), it is easy to see how we are entering an exciting time of change and opportunity in the transportation sector. The path will be filled with obstacles, especially those concerning safety and market adoption.

**Figure 4-29: How Self-Driving Cars Work**



### f. Commercial Vehicle Operations (CVO)

Utilizing and integrating ITS with freight movement is critical to achieving efficient freight movement and supporting the region's freight network. According to the New Mexico Trucking Association, the Traveler Information ITS Service (NMRoads.com) that alerts drivers of hazardous conditions downstream has proven essential to the efficient and safe operation of freight movement within the AMPA and the state as a whole. Alerting freight operators of impending lane reductions, closures, or inclement weather conditions allows them to plan their route accordingly to avoid or minimize any associated delays. Many freight corridors have no viable or parallel route alternative within the AMPA, which necessitates a decision to detour far upstream, sometimes hundreds of miles away.

The I-40 corridor through the Tijeras Canyon is a particularly weather-sensitive area that suffers full closures due to snow and/or ice conditions during the winter season. In the event of closures, staging areas also become an issue as trucks must exit the freeway to find adequate areas to lay in wait until the facility is passable.

### ***Parking and Lay in Wait Facilities***

Urban areas, where there are higher concentrations of industrial/warehousing/commercial properties, require short-term staging parking for vehicles waiting to make a pickup or delivery at a specific location. This demand is in addition to the need for short breaks and overnight rest to satisfy Hours of Service (HOS) rest requirements. Therefore, trucks typically try to park as close to the loading/delivery location as possible and the short parking duration leads to more turnover at any single location. Many commercial businesses have specific windows during which trucks can be on site to load or unload their goods. Distribution and warehouse facilities want to maintain the most efficient truck delivery schedule possible to maximize onsite labor and resources, and therefore may add penalties to trucks arriving late for deliveries or pickups. Large retail shippers, such as Walmart and Amazon, levy penalties on tardy deliveries (including companies and drivers), a punishment which has become more common in the industry.<sup>35</sup> These factors, along with HOS regulations puts more incentive on drivers to show up early. The NMDOT and area enforcement entities continue to work with the motor carriers to identify viable options (such as the New Mexico State Fairgrounds), however, in the event of longer-term full roadway closures, long-haul freight companies are expressing the desire to not be staged in short-term parking facilities, rather, they prefer to be turned-around and allowed to make the larger detours to get back on the road en route to final destinations.

The private sector can play a role in providing truck parking, particularly shippers and receivers who generate a significant portion of the truck parking demand. When local jurisdictions allow for new development, but do not also account for the increased level of truck parking needs, the costs for mitigating these needs are passed on to others. Requiring shippers and receivers to provide on-site parking or contribute their fair share to the cost of a common parking area, will help meet the parking demand while also help spread the costs of providing truck parking. The dissemination of real time travel conditions via NMRoads.com, dynamic message signs, and highway advisory radio have proven invaluable to truckers en route and far-enough upstream so that, in most cases, decisions can be made to either detour or stop at a location with adequate services.

### ***Inspection Stations***

Freight/trucking commodities is a regulated activity subject to certifications on weight/load, safety records, and other permitting as required by each state. Inspection stations are typically located at ports of entry and are administered by state motor transportation divisions. In order to minimize delay these stops may incur on trucks en route, the New Mexico Motor Transportation Division has employed an automated vehicle identification (AVI) system, *PrePass*, that allows for pre-screening at designated inspection stations, thus minimizing unnecessary stop delay. The designated *PrePass* weigh stations in New Mexico are located along the I-25 corridor at Anthony and Raton, the I-40 corridor at Gallup and San Jon, and at the I-10 corridor at Lordsburg. Based on 2012 *PrePass* activity data, approximately 85 to 90 percent of all trucks entering the state “pass through” along these interstate corridors. Automated systems like *PrePass* help to ease congestion around inspection facilities and result in operating cost savings for freight operators. Ultimately these cost savings are passed on to consumers.

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<sup>35</sup>Jaillet, James. “New Walmart policy dings truckers, shippers for late loads—and early ones.” *Overdrive Online*. 01 August 2017. <https://www.overdriveonline.com/new-walmart-policy-dings-truckers-shippers-for-late-loads-and-early-ones/>.

## ***Pro-Miles Software***

Another encouraging example of ITS utilization is the Pro-Miles software, currently being tested by the Department of Public Safety, Motor Transportation Division. This software would replace the automated commercial system (ACS), which is used to track, control, and process the movement of all goods and especially goods imported into the United States. ACS is considered an antiquated and slow permitting system. All commercial motor carrier vehicles that pass-through New Mexico Port of Entry Stations must obtain clearance certifications. Pro-Miles software allows for faster management of the permitting process when paired with new scanning technology such as license plate readers. Since this software is electronic, acquiring the required freight trucking permits to enter, leave, or travel through New Mexico would require less time and freight trucks would not be required to stop at each state point of entry. Pro-Miles has the capability of interactive routing, so the software can alert truck drivers upstream of an accident and of potential detours. This software will also enable improved data collection about freight truck routes and congested areas. Full deployment of Pro-Miles is anticipated for March 2020.

## **g. Freight Performance**

According to the American Association of State Highway and Transportation Officials (AASHTO), the transportation sector, which includes highways, railroads, waterways, ports and airports, and freight is a \$1.2 trillion industry that generates eight percent of the nation's jobs and supports industries that make up 84 percent of the economy. Therefore, the quality and functionality of a region's infrastructure are critical.

The Albuquerque region's freight system delivers goods into, within, and out of the region. These functions are not only a vital concern to local and national economies, but also to residents who need necessities like groceries or gasoline. The freight industry is more than trucks and trains, and includes important aspects like fleet management, logistics, and warehousing that facilitate goods movement to trucks, trains and air deliveries that distribute products where they need to go. The economic implications of delays and congestion are well-established. Ensuring that the AMPA's transportation system and infrastructure are reliable creates a competitive edge by providing efficient freight movement and the ability to deliver products at a lower cost. For consumers in the area, improved access to these goods raises their standards of living. Synchronizing multimodal freight movement and enabling the transfer of goods between different freight modes to occur more seamlessly will result in a more efficient and economical freight transportation system. Supporting the region's freight system plays a critical role in meeting the MTP's goals of supporting the region's economic vitality and mobility.

## ***FAST Act Freight Requirements***

In recognition of the critical role that transportation infrastructure plays in regional and national economic performance, the FAST Act places increased emphasis on assessing local freight-related needs. While the U.S. Department of Transportation has not yet released the final FAST Act national vision, goals, or performance measures for freight,<sup>36</sup> MRMPO is working with the NMDOT to integrate these performance measures into state and regional planning processes.

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<sup>36</sup> MRMPO has access to system-wide speed data, vehicle hours of delay, percentage of the network in congested conditions, congested conditions along freight corridors and rivers crossings, enabling MRMPO to create baseline freight data that can be monitored and potentially integrated as freight performance measures.



Early guidance has been identified for future interest areas and priorities related to freight movement, which include:

- Financing shortfalls
- Aging infrastructure
- Demographic trends, since growing population in urban areas will increase congestion and affect freight movement
- Enhancement of technology operations
- Global/domestic commercial and economic trends creating new challenges for meeting freight Demand and passenger transportation needs
- Shifting energy economies and fuel sources, which create significant disruptions as well as opportunities for innovation
- Impacts to infrastructure resulting from climate change

MRMPO has access to system-wide speed data, vehicle hours delay, percentage of the network in congested conditions, congested conditions along freight corridors and rivers crossings. This information will enable MRMPO staff to create baseline freight data that can be monitored and potentially integrated as freight performance measures.

### ***General Freight Concerns***

During previous outreach efforts with local freight stakeholders, long-haul truckers voiced concern that the interstates are not functioning as well as they need to make timely and efficient deliveries. Congestion is a major concern, while safety is a high priority among local freight stakeholders. Other observations and concerns among the region's freight community include the following:

- Insufficient truck parking and a lack of rest areas to accommodate overnight stays
- The private sector, particularly shippers and receivers can offer solutions with a combination of additional on-site or combined shared parking capacity .....
- Freeway closures due to incidents are increasingly costly to carriers (and ultimately consumers)
- In the event of full long-term roadway closures, long-haul freight companies are expressing the desire to not be staged in short-term parking facilities, rather, they prefer to be turned-around and allowed to make the larger detours to get back on the road en route to final destinations
- Traffic delays are compounded by the inability of tow vehicles to reach and clear disabled vehicles
- Poor communication with trucking associations and drivers about truck restrictions
- Incident management – lack of information during weather or other closures results in costly delays and could be mitigated through the following actions:
  - Truck detouring – direct trucks to appropriate stops when incidents occur
  - Staging rest areas – identifying appropriate staging areas for trucks when incidents occur
- Insufficient turning radii for certain truck sizes
- Lack of education on safety and knowledge about truck blind spots

## *Truck/Freight Restrictions*

Regional freight stakeholders shared common concerns, often related to freight restrictions dealing with weight and river crossings:

- Weight and bridge height restrictions: There are truck restrictions on facilities that make local trips longer and more costly than they need to be. Additionally, time of day/day of week restrictions further hamper the movement of goods and compound congestion at critical times. Weight and bridge height restrictions on the river crossings at Paseo del Norte and Montañito Rd mean that shippers must route their fleets across I-40 or Alameda Blvd to serve high-growth markets on the west side of the Rio Grande.
- River crossing restrictions: Due to bridge heights and certain areas that do not have infrastructure designed to support freight movement, crossing the Rio Grande is one of the greatest challenges facing local haulers. The lack of truck-accessible bridge crossings means that under interstate closures, Alameda Blvd – the sole arterial bridge crossing between I-40 and US 550 – takes on a disproportionate volume of truck traffic.
- Truck restrictions/lack of alternative routes: A further impediment to freight movement on the Westside is the restriction on Unser Blvd from Ladera Rd to Rainbow Blvd. This restriction effectively makes Coors Blvd the sole north-south arterial for freight movements west of the river. Atrisco Vista Blvd, well west of significant commercial development, functions as an arterial route for through movements to markets in far northwest Albuquerque and Rio Rancho.

## ***Freight and Logistics Committee (FLC)***

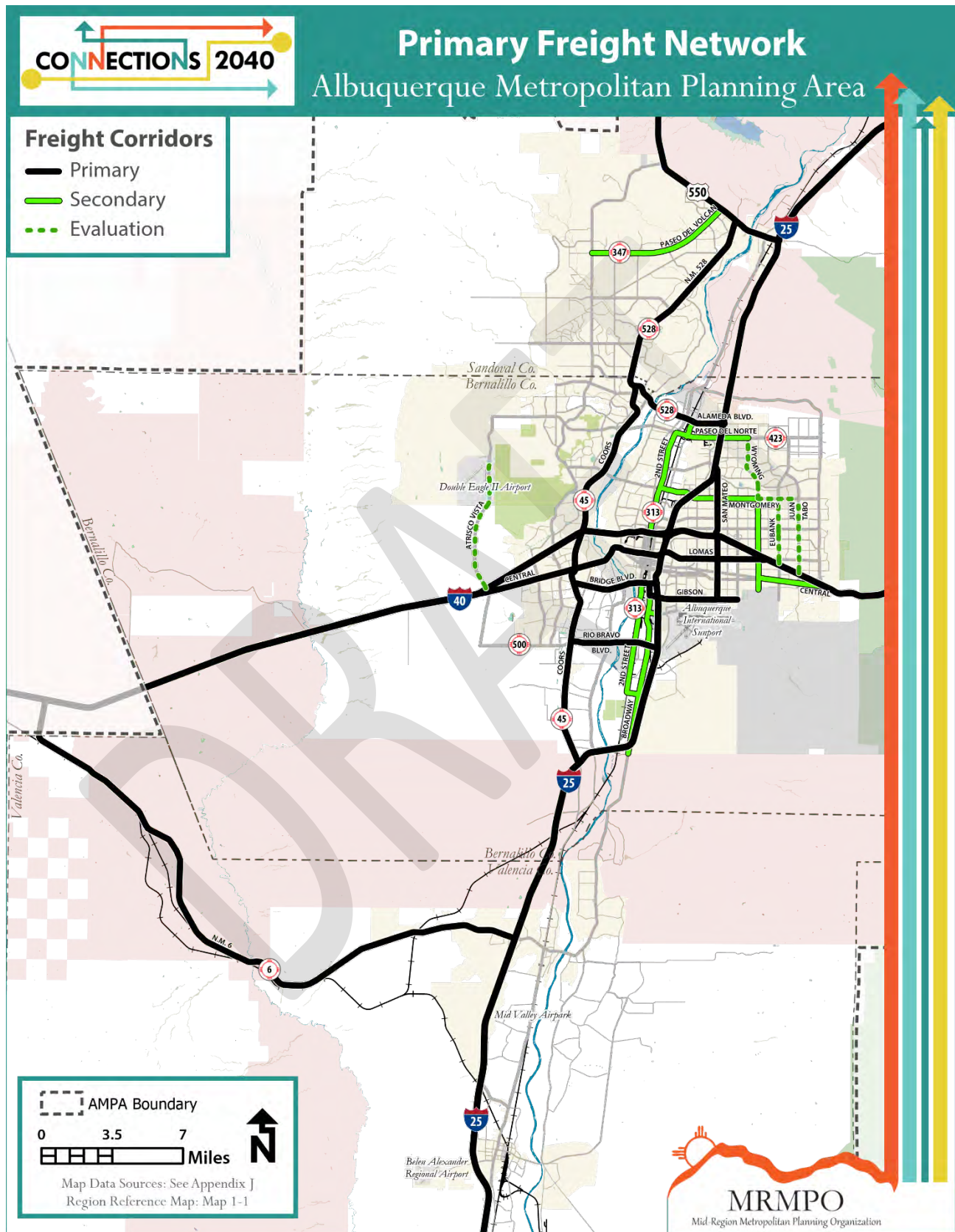
In pursuit of a more organized freight planning framework for the AMPA, MRMPO has established a Freight and Logistics Committee (FLC). The committee is a subcommittee to the TCC whose purpose is to provide recommendations on improving the transportation infrastructure in support of the flow of goods across all modes in the MRCOG region. Membership includes MRMPO member agencies as well as other public agencies and private associations with pertinent interest in improving freight and goods movement within the AMPA and MRCOG region. Specific areas of focus include policy, freight and truck restrictions, and the identification, evaluation, and potential recommendation of candidate parcels ideally suited for cargo-oriented development (COD), as well as any other freight related matters in the region. The committee met in the Fall of 2019 and some important issues are listed below:

- Consideration of last-mile distribution and same-day/2 day deliveries as industry standard
- Provision of parking demand and capacity
- Promotion of Trucking Centers
- Restrictive environments that discourage inter-state trucking, such as weather and lack of by-pass
- Effects of newly enacted Electronic Data Logs (EDLs) and impacts to the existing traffic during peak and off peak times
- Desirability from the industry to pursue public private partnerships (PPPs) as a policy-driven tool for additional funding of projects
- Coordination of local, regional, and State-wide activities

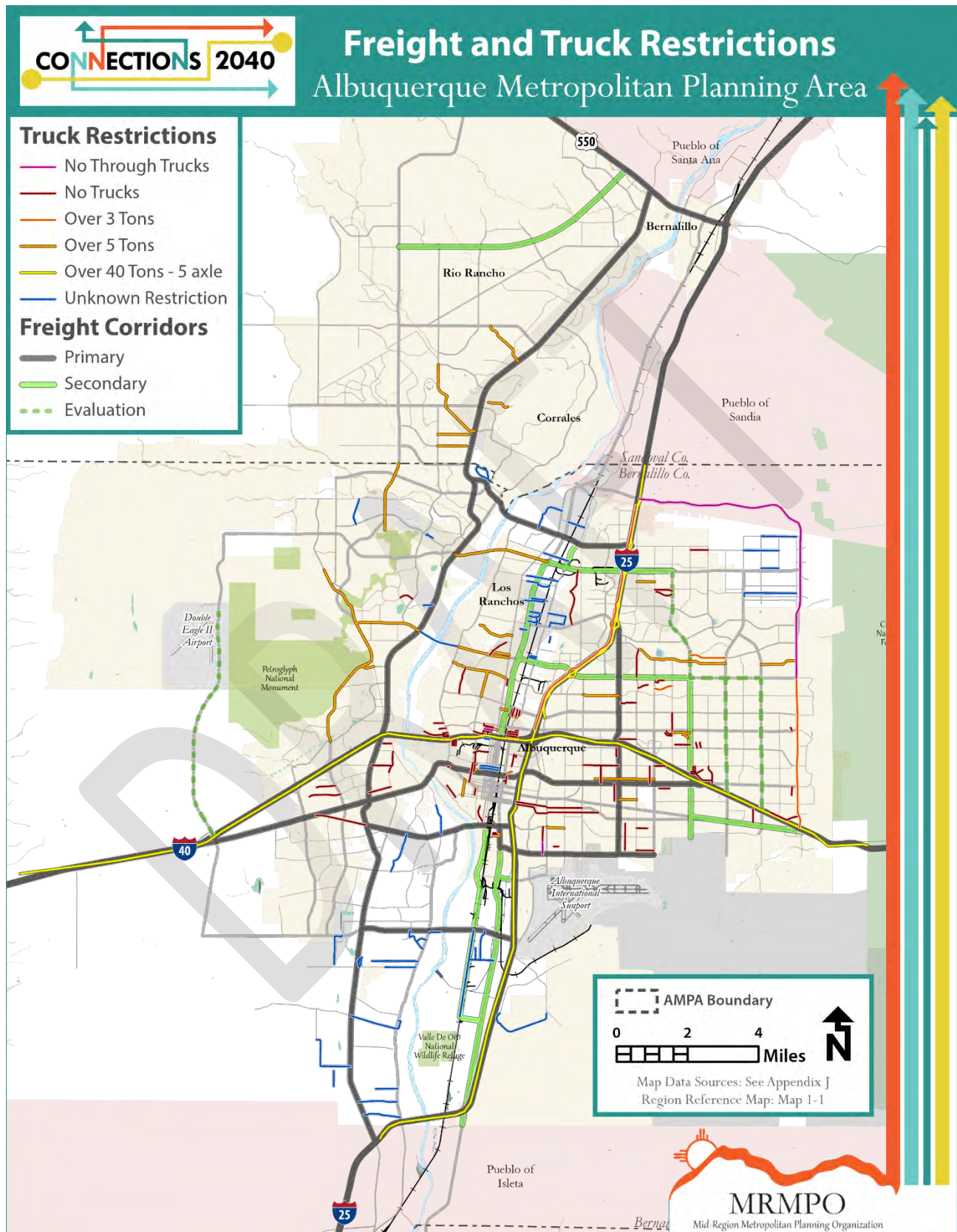
## ***Primary Freight Network***

To help prioritize freight-related improvements and understand truck travel patterns, MRMPO developed a primary freight network. The map identifies corridors that support through movements; not depicted are those routes with adequate vehicle weight capabilities that serve local delivery. Also shown are the various locations around the AMPA where truck freight travel is restricted. Such restrictions have important implications, particularly for deliveries across the Rio Grande. Primary corridors include I-25, I-40, Coors Blvd, NM 528, Alameda Blvd, and several other river crossing facilities.

Map 4-17: Primary Freight Network



Map 4-18: Freight and Truck Restrictions





### ***Truck and Freight Roadway Operations***

Albuquerque is located at the intersection of the I-40 and I-25 interstate facilities, which NMDOT identifies as the major freight-designated routes within the AMPA for truck freight. According to a July 2013 report from the American Transportation Research Institute (ATRI), this important intersection is number 121 of the 250 most congested in the United States. I-40 serves as a major cross-country route because it connects the Port of Long Beach, CA, to eastern markets. In addition, hours of service regulations require trucks to drive no more than 11 hours per day and work no more than 14 hours.

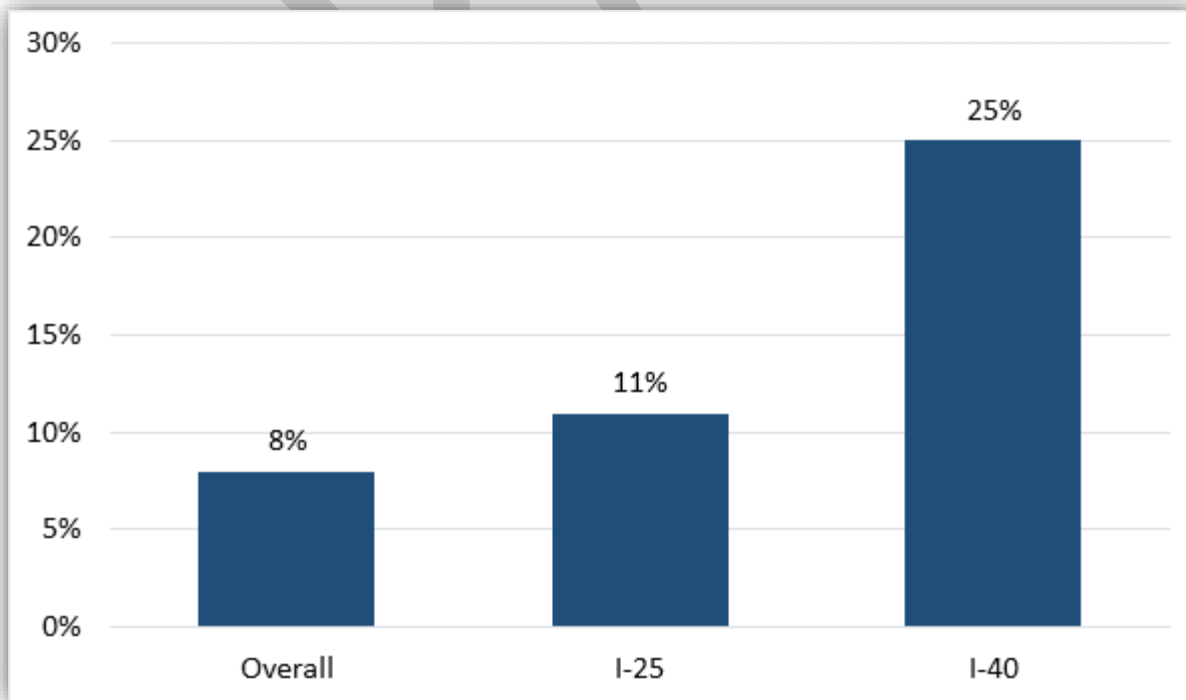
**This makes New Mexico a logical stop for trucks driving east from California. In addition, Albuquerque is about 12 to 14 hours from Houston, TX, another major port. According to a recent report by the Brookings Institute and JP Morgan Chase, Albuquerque falls within the top quintile of interstate traders with a 91.2 percent interstate share.**

Therefore, the AMPA plays a crucial role linking the country's freight network and preserving and maintaining interstate facilities is of significant national and regional interest.

### ***Regional Commercial Vehicle Counts***

The overall percentage of commercial vehicles (those vehicles larger than passenger car, truck, or two-axle six-tire truck) on the AMPA transportation network is about eight percent. However, when considering the proportion of commercial vehicles on I-40 through the AMPA, the percentage jumps to nearly 25 percent, indicating the importance of interstate freight travel along the I-40 corridor. **Data from New Mexico Department of Public Safety, Motor Transportation Division shows that the vast majority of these trucks, roughly 85-90 percent, are crossing the state without conducting local deliveries.** Commercial vehicle counts on I-25 are not nearly as high, with 11 percent of all traffic volume classified as commercial vehicles at the southern boundary of the AMPA.

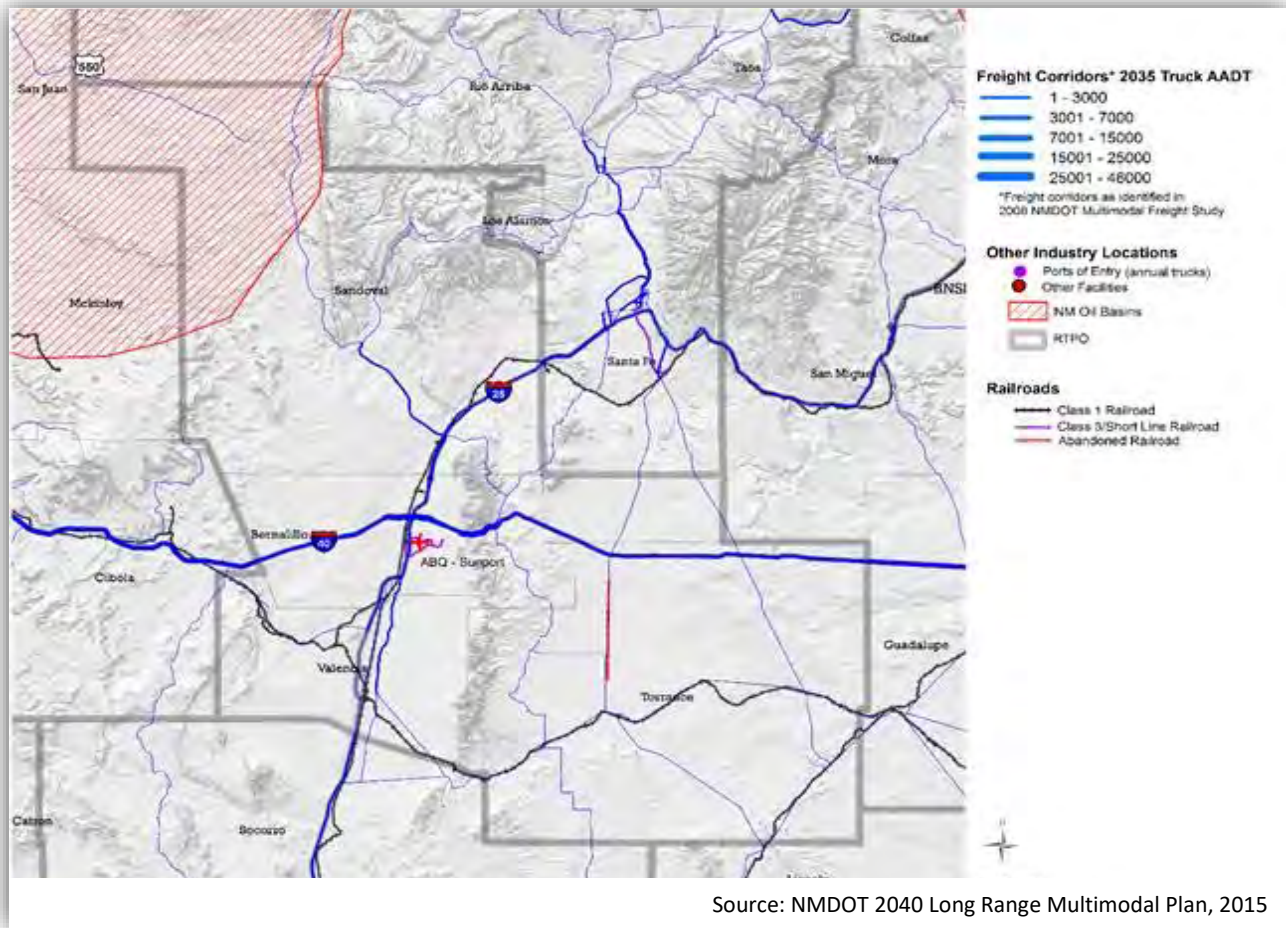
**Figure 4-30: Percentage of Commercial Vehicles out of Total Traffic Volume**



### Freight Network Performance

Roadway performance on the Freight Network is sourced from the NMDOT as well as the National Performance Management Research Data Set (NPMRDS) for volumes and speeds.

**Figure 4-31: 2035 Truck Average Annual Daily Traffic on Freight Corridors**



### Future Truck Traffic

According to the Federal Highway Administration's Freight Analysis Framework (FAF), I-40 at the western AMPA boundary had annual average daily truck traffic of 8,670. **By 2040, that number is projected to increase by 240 percent to over 20,000, comprising over 43 percent of all traffic.** I-25 at the northern boundary of the AMPA had annual average daily truck traffic of nearly 3,900 trucks and is forecasted to reach over 6,300 trucks in 2040. This level of growth in truck freight travel not only indicates the value of maintaining the roadway infrastructure in the AMPA in good working order but will place additional strain on that same infrastructure and contribute to growing congestion challenges.

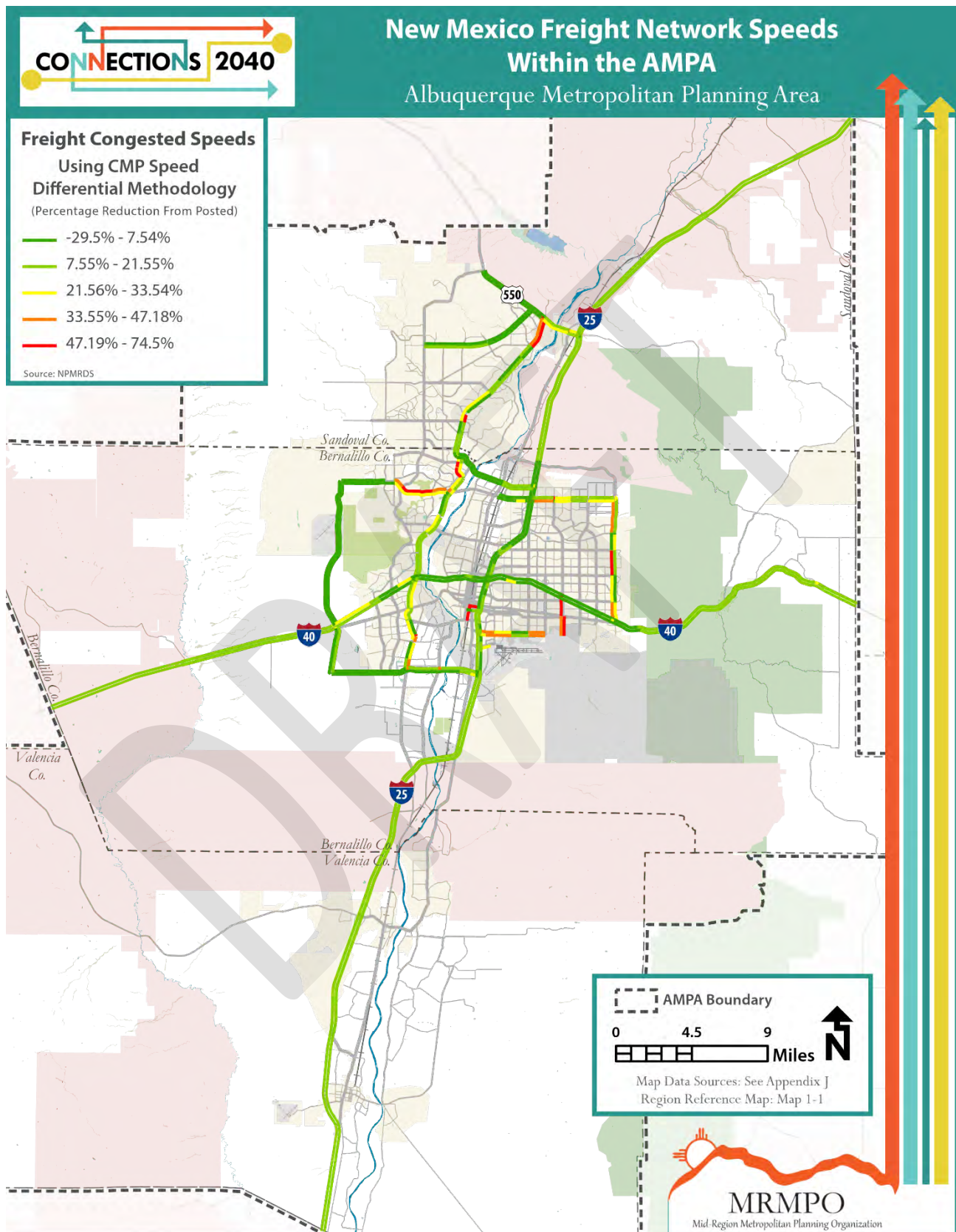
There are no exclusive truck-only lanes within the AMPA, meaning that truck traffic is not given any priority and must operate on the same roadway lanes as general purpose vehicles. With no truck lanes programmed in future years of the MTP, the amount of freight traffic operating under congested conditions (measured in lane miles of roadway) becomes a serious issue that will adversely affect trucking operations including lengthened delivery times and increased operational costs. The current and anticipated growth of truck freight travel taking place under congested conditions for each scenario in the MTP is shown below.

**Figure 4-32: Percentage of the Commercial Vehicle Network Operating under Congested Conditions**

**[In process of being updated]**

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Map 4-19: Freight Speeds



## a. Incident Management Plan (IMP)

Transportation agencies within the Albuquerque Metropolitan Planning Area (AMPA) have long recognized the need for a coordinated Incident Management Plan (IMP) that includes strategies, both single and multi-agency to address disruptions in traffic flow resulting from crashes, adverse weather conditions, special events, or other occurrences and reduce the incident response and clearance times.

**Local statistics from NMDOT have shown that for every 1 minute a lane is closed there is a resulting six minutes of delay. Further, the likelihood of secondary crashes (crashes resulting from the initial crash) increases by 2.8 percent for each minute the primary incident continues to be a hazard<sup>37</sup>.**

Significant events often result in lane closures and backups, the resulting detoured traffic relies on adjacent arterials that are not necessarily prepared to handle the additional traffic, thus causing tremendous disruptions in flow. With numbers like these it is easy to see that closures of any duration can have huge consequences with added congestion and traveler delay, reduced safety with impeded first responders, and loss of productivity, and increased risk of secondary crashes.

### *Collaboration Among Stakeholders*

The optimal IMP involves collaboration among all stakeholders of the roadway system including transportation agencies, first responders, the towing industry, and those involved in managing roadway operations. Though agency management and operators are often quite responsive to each other's needs and respond to requests to manage cross-jurisdictional traffic operations, no formalized system or protocol has existed in the AMPA. Further exacerbating the disruptive impacts of incidents in the AMPA is the fact that there are no redundant freeway systems and, in most cases, the arterials serve as *de facto* alternative routing. The current communications platform for traffic management, NMRoads.com, is not enough. In addition, and not helping matters, is that the AMPA has relied on disparate uncoordinated plans of each agency.

### ***New Regional Incident Management Plan***

Fortunately, the current TIP includes a multi-agency incident management project (a300971) that is managed by the MRMPO involving key transportation infrastructure owners and operators. The plan, due to be completed at the time of approval of this document, will establish a fully integrated IMP comprised of the critical transportation entities, and incident responders, and will include well-vetted event driven response protocol. It will also include the identification of critical gaps in both infrastructure and coordination, with different scenarios for recurring and non-recurring events having "significant impact" defined in terms of duration, queue-length, severity, or a combination thereof.

Goals and functional needs will be established, and roles and responsibilities identified for each of the responsible operators and managers of the system. State-of-the-art strategies for transportation management that rely on existing and emerging data collection and shared communications practices will be developed. This will provide a template to guide a coordinated and timely roadway operators' efficient response to roadway events, as well as provide travelers with adequate situational information that will assist in their travel decisions.

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<sup>37</sup> USDOT FHWA Traffic Incident Management Performance Measures Final Report, FHWA-HOP-10-009



## 4.4 System Preservation and Maintenance

An important consideration for improving the operations and management of the transportation system involves the physical condition of existing roadways. Maintenance is important because roads in poor condition result in increased occurrences of congestion, delay, and vehicle damage as well as increased fuel consumption and travel time. Further, the FAST Act includes performance-based planning measures to facilitate priority decision making based on performance and infrastructure maintenance cost obligations.

### a. Asset Management Plans

The FAST Act includes priority decision making emphasis based on performance-based planning including measurable performance and infrastructure maintenance cost obligations in transportation programming. Specifically, State DOTs are now required to produce and maintain a Transportation Asset Management Plan (TAMP) that includes:

1. Inventories of pavement and bridge conditions;
2. Identification of management objectives and measures, and;
3. Financial and investment strategies to address deficiencies across the system to sustain a desired state of good repair.

Categories include good, fair, and poor for both pavement and bridges. The NMDOT has developed the baseline assessment of condition to meet the FAST Act requirements as part of a two-year Planning Work Program (UPWP). Included are established performance two year and four year “targets” to help guide life cycle planning and programming decisions to ensure that monies are used wisely, and that the roadway infrastructure is maintained in a state of good repair. MRMPO is subject to the four-year targets. The assessment relies on the International Roughness Index (IRI) to assess such items as pavement ride quality, surface cracking, and pavement structure into a composite measure, which is the standardized methodology for monitoring conditions across all agencies. It includes a comprehensive assessment of current and future conditions, as well as the identification of construction practices and design procedures to ensure reliable pavement and bridge performance.

#### *NMDOT Data Collection*

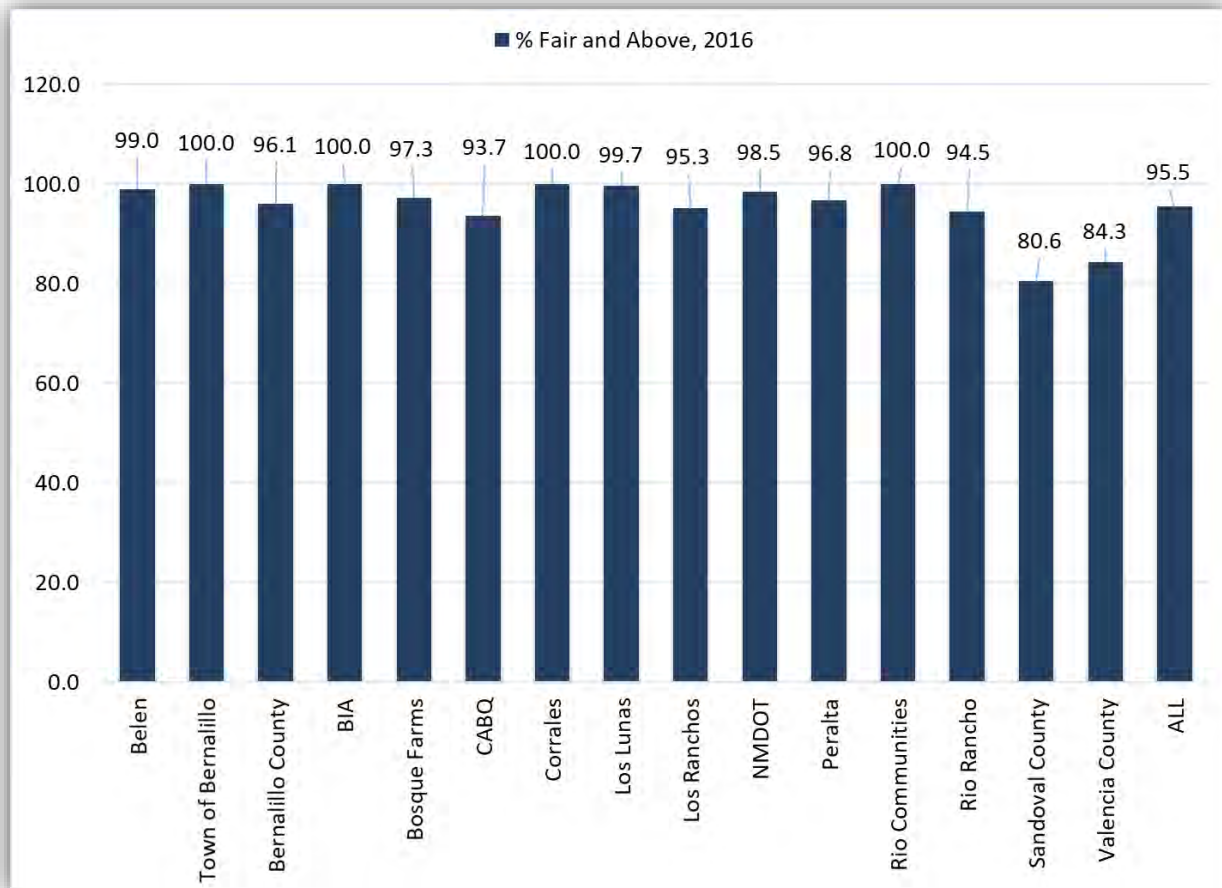
Although the FAST Act specifies that TAMPs involve at a minimum the interstates and the National Highway System (NHS), the NMDOT took this opportunity to collect condition data on the entire roadway transportation system including the remainder of non-NHS roadways for the year 2016. This dataset is ideal for the regional assessment as it presents a uniform and consistent methodology across all jurisdictional boundaries. It is with this dataset that MRMPO is assessing pavement and bridge condition within the AMPA. MRMPO will play a key coordinating role to involve all member agencies within the AMPA to ensure that all roadways and bridges are included in this ongoing endeavor, and the MRMPO will continue working with the NMDOT, member agencies, and the Project Prioritization Process to integrate asset management and life cycle performance targets into local project programming.

### b. Pavement and Bridge Conditions

Roadway conditions nationwide are generally reported to be in dismal condition— according to the American Society of Civil Engineering’s *Report Card on America’s Infrastructure*, one-third of all roadways in America are in poor to mediocre condition and more than a quarter of all bridges are either structurally deficient or functionally obsolete. System preservation among MRMPO agencies is a high regional priority, even with a vast majority of roadway mileage (95.5%) in “Fair” condition or better.

Because this is a new methodology established by the NMDOT, MRMPO cannot compare this assessment with historic data from past MTPs. However, this comprehensive database allows MRMPO to summarize all pavement condition for all roadways within its boundaries in a single database that establishes a common baseline and will support future assessment.

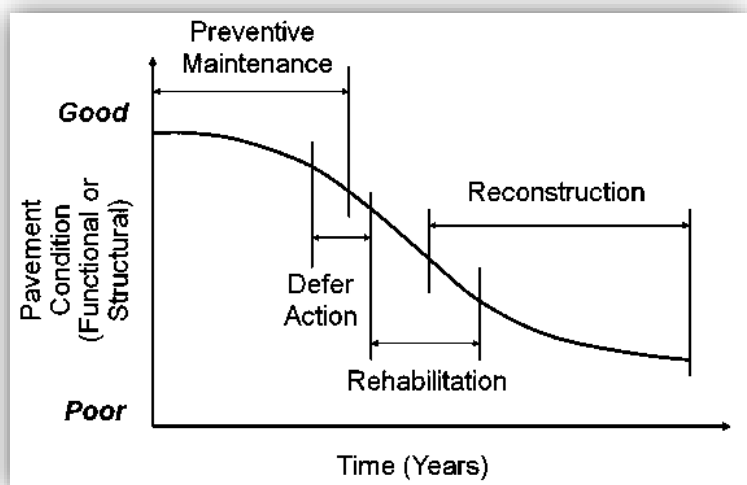
**Figure 4-33: Agency Pavement Conditions based on NMDOT Bridge and Pavement Management System**



Agency-specific pavement management systems are established within respective public works departments to monitor conditions and ensure that timely maintenance treatments can be deployed to avoid roadway deterioration. The standard pavement life-cycle curve shown indicates how maintenance enhances the performance as well as lifespan of roads. Indeed, deferring roadway maintenance often leads to greater long-term costs, while preventive treatments are almost always cheaper than reconstructing a road.

Source: Southern Slurry and Micro Surfacing Inc.

**Figure 4-34: Typical Pavement Preservation Curve**

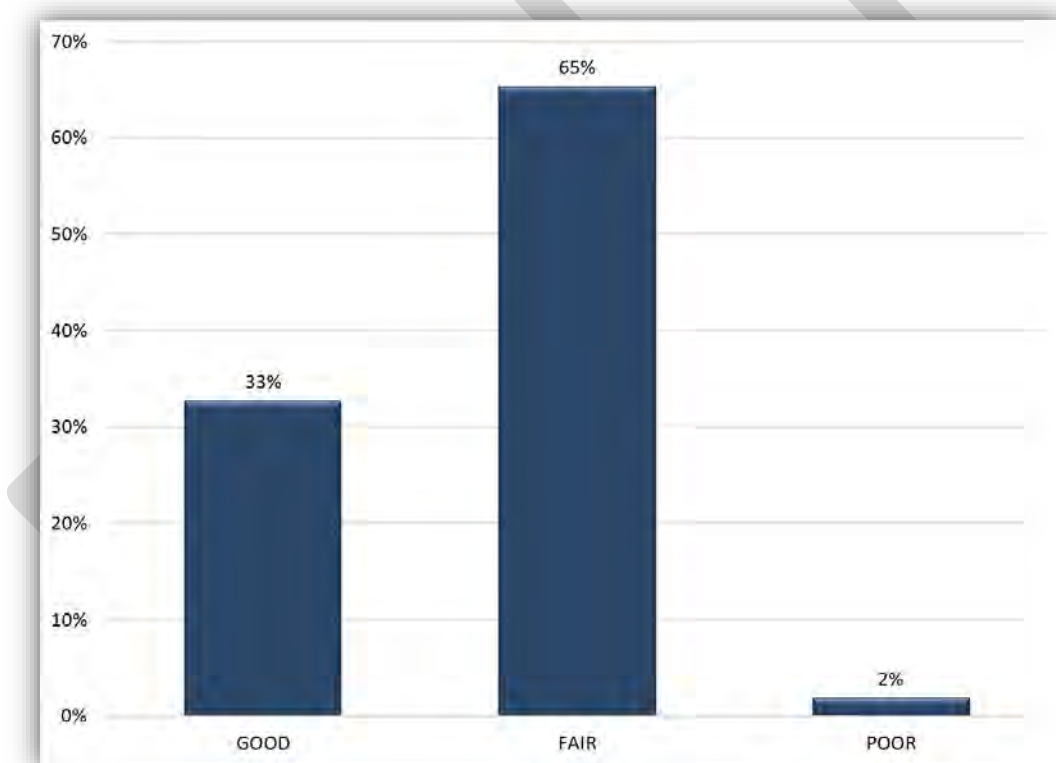


Agencies within the AMPA are varied in are currently in the process of refining their respective pavement management systems, however, performance condition targets will be established by the NMDOT for monitoring purposes, and effort is currently being made by MRMPO to develop a coordinated methodology among its member agencies.

#### *National Bridge Inventory (NBI)*

FAST Act emphasis on asset management includes bridge infrastructure and relies on the National Bridge Inventory (NBI) standards on bridge deck, superstructure, and substructure condition with the new legislation requiring that no more than 10 percent of the total bridge deck area on NHS routes be structurally deficient. Although FAST Act focuses exclusively on the NHS, MRMPO is utilizing the NMDOT's efforts as noted above to summarize all bridge ratings on the roadway system within the AMPA (the NMDOT Bridge Section has the responsibility of maintaining bridges for the entire state of New Mexico). Per the NMDOT's Asset Management database, the percentage of bridge structures in the AMPA that are ranked as structurally sufficient is 98.1 percent, and less than 2 percent of bridges are rated as either in need of rehabilitation or need replacement entirely.

**Figure 4-35: Agency Bridge Conditions based on 2016 NMDOT Bridge and Pavement Management System**



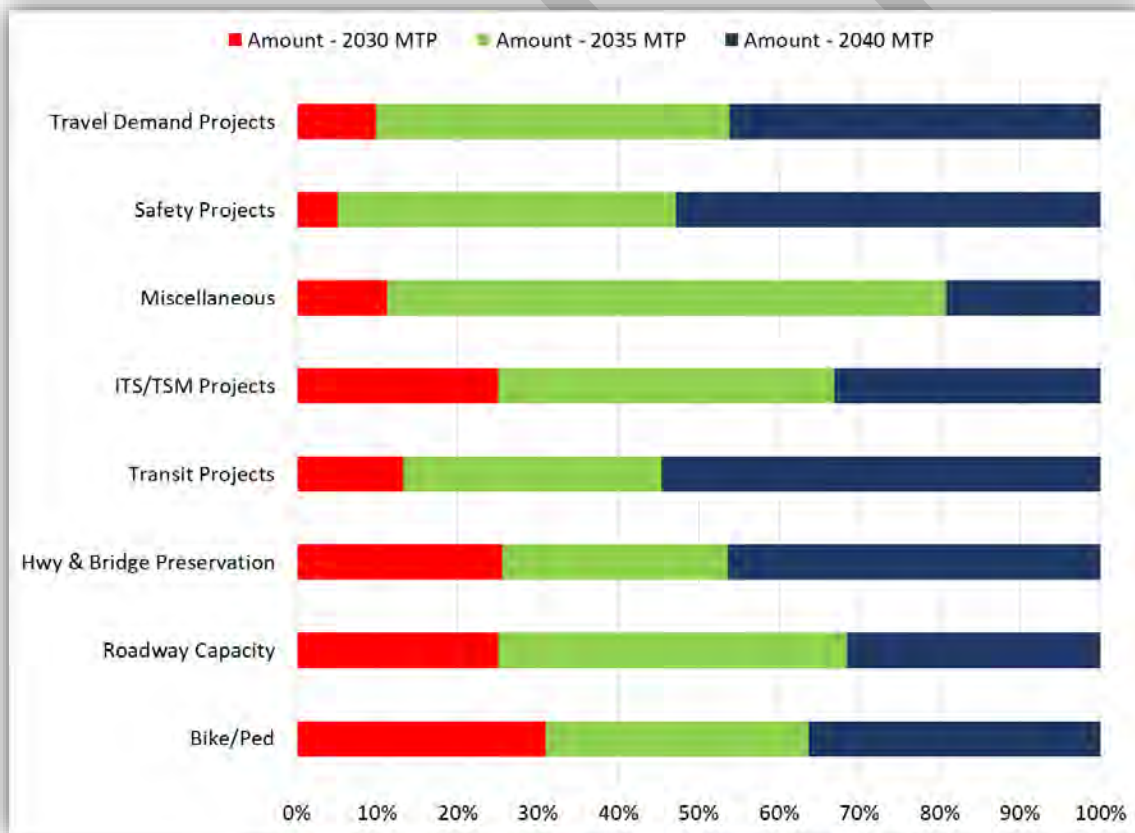
#### **c. Maintaining Transportation Infrastructure**

Roads play a crucial role in economic development because they provide access to employment, health, education, recreation, and social services. Any new roadway projects should fill a critical gap in the regional network rather than just adding miles to the roadway inventory that is already substandard in terms of maintenance. Poorly maintained infrastructure increases costs, and deferring maintenance escalates the costs and risks associated with an aging transportation network.

The *Infrastructure Report Card; Key Facts About New Mexico's Infrastructure*, produced by the American Society of Civil Engineers (ASCE) illustrates that, “77,205 miles of public roads, with 31% in poor condition. Each motorist pays \$769 per year in costs from driving on roads in need of repair.” The Federal Highway Administration projects that for every dollar spent on roadway infrastructure maintenance there is a return of \$5.20 in the form of lower vehicle repair costs, decreased delays, reduced fuel consumption, improved safety, lower, long term, road and bridge maintenance costs, and reduced vehicle emissions due to improved traffic flow.<sup>38</sup>

Investment in transportation infrastructure maintenance not only preserves current assets but lowers the future cost of repair and or replacement. For the AMPA to remain competitive in the national and global economy, it is essential that improvements to the existing transportation infrastructure are prioritized above projects that add unnecessary capacity to the network. This chart illustrates an increasing emphasis toward maintaining the region’s existing infrastructure and transit investment when it comes to programming transportation funds in the MTP.

**Figure 4-36: Types of Capital Investment in the Region**



<sup>38</sup> 2017 *Infrastructure Report Card*, 2017, [www.infrastructurereportcard.org/](http://www.infrastructurereportcard.org/).